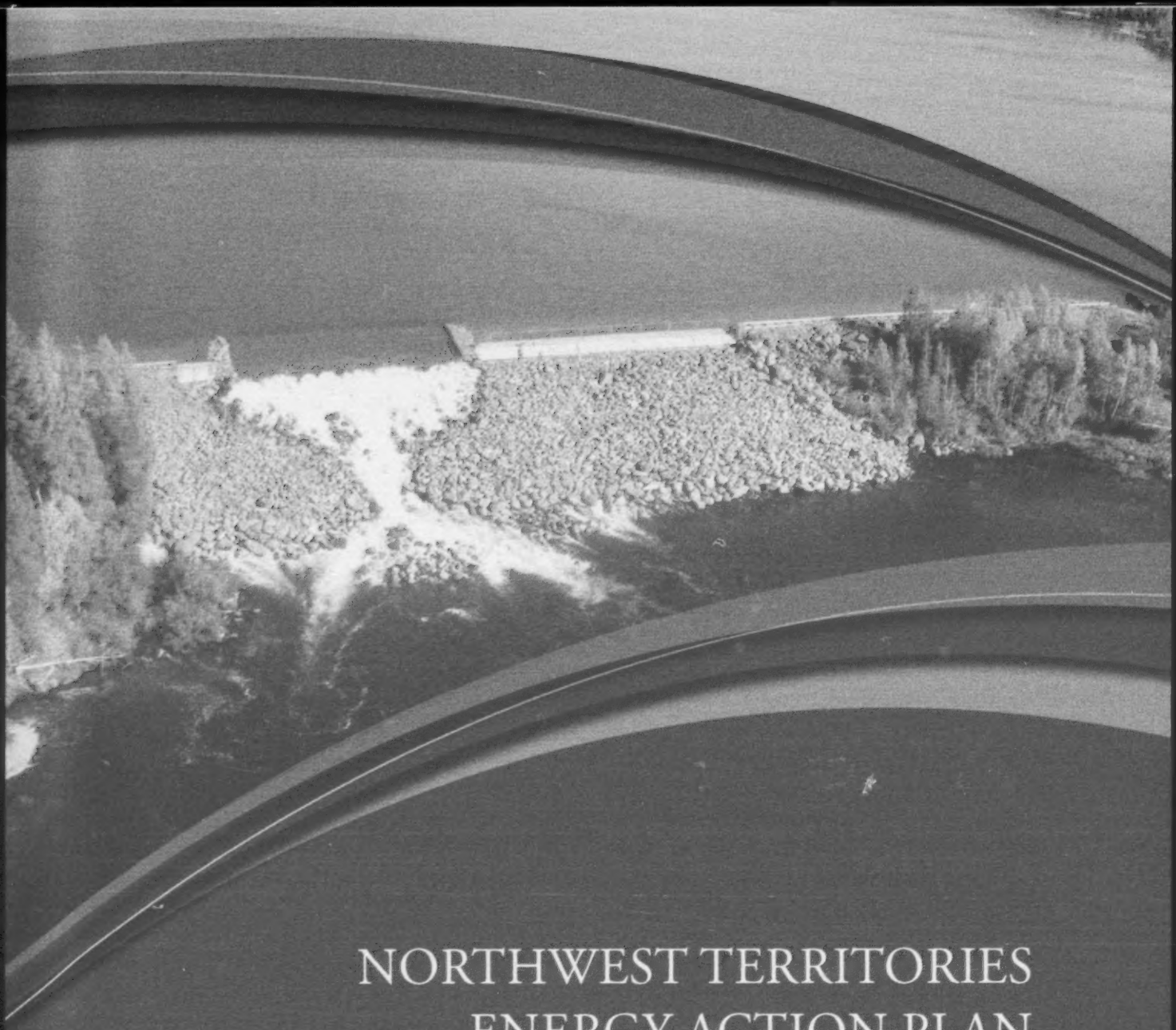


NORTHWEST TERRITORIES ENERGY ACTION PLAN

A THREE-YEAR ACTION PLAN AND A LONG-TERM VISION

Northwest Territories

December 2013

ABBREVIATION KEY

AEA	Arctic Energy Alliance
AETP	Alternative Energy Technology Program
ANSI	American National Standards Institute
CARF	Capital Asset Retrofit Fund
CSA	Canadian Standards Association
CTVA	City, Towns and Villages Act
DOT	Department of Transportation
EEIP	Energy Efficiency Incentive Program
ENR	Environment and Natural Resources
EOS	Economic Opportunities Strategy
FR	Forest Resources
GHG	Greenhouse gas
GJ	Gigajoule
GNWT	Government of the Northwest Territories
GRA	General Rate Application
GREP	GNWT Rate Equalization Program
IEA	International Energy Agency
kT	Kilotons
kW	Kilowatt
kWh	Kilowatt hour
LIC	Local Improvement Charge
LNG	Liquefied Natural Gas
MDS	Mineral Development Strategy
MLAs	Members of the Legislative Assembly
MW	Megawatt
NGO	Non-Governmental Organization
NT Energy	Northwest Territories Energy Corporation
NTPC	Northwest Territories Power Corporation
NUL	Northland Utilities
NWT	Northwest Territories
NWTHC	Northwest Territories Housing Corporation
PUB	Public Utilities Board
PV	Photovoltaic
PWS	Public Works and Services
TPSP	Territorial Power Subsidy Program
WETT	Wood Energy Technology Transfer

Front Cover Image: Bluefish Refurbished Dam, Source: NTPC
Inside Front Cover Image: NWT Forest, Source: GNWT/ITI

MINISTERS' MESSAGE

There is consensus across the Northwest Territories (NWT) on the need to reduce our high cost of energy and the impact fossil fuel consumption has on the environment. To help achieve this goal, the Government of the Northwest Territories (GNWT) is pleased to provide the Northwest Territories Energy Action Plan (Energy Plan).

The Energy Plan is a product of a collaborative policy development process, reflecting the goals and aspirations of residents, communities, and Aboriginal governments. The process confirmed that the collective vision for energy in the NWT hinges upon reducing imported oil, reducing our high energy costs and greenhouse gas emissions, and increased utilization of renewable forms of energy. To accomplish this, it is clear that this vision also needs to reflect the need for supporting energy infrastructure. With these factors in mind, we have developed the following over-arching goal:

> *Short term actions and long term planning for energy supply will be aimed at reducing energy costs, imported oil, and greenhouse gas emissions in the NWT through energy conservation, increased use of renewable energy, and enhanced energy infrastructure.*

The Energy Plan was developed in conjunction with the NWT Power System Plan (Power System Plan) developed by the NWT Energy Corporation. The Power System Plan reflects a long-term vision for our electricity infrastructure needs over the next 20 years. With the right energy infrastructure, we have the potential to transform our energy systems over the long term.

In the short term, there are many opportunities. Highlights of the opportunities contained in our Energy Action Plan include:

- The Territory has had tremendous success in the establishment of a thriving biomass industry in its North and South Slave communities. It is time to build on this success by expanding the supply chain up the Mackenzie, as well as supporting the development of locally sourced biofuel. The GNWT's investments in biomass boilers are accruing over $1 million in savings annually and the NWT is recognized as a national leader in the use of these systems. Building demand and the establishment of biomass supply chains through government investment will remain an important goal, as reflected in the Biomass Strategy.
- Liquefied Natural Gas (LNG) has emerged as a promising addition to our energy mix that one day could be used in many of our road accessible diesel communities. LNG can reduce energy costs and GHG emissions and the Northwest Territories Power Corporation (NTPC) will incorporate LNG into its Inuvik and Fort Simpson operations.

- With a proven wind development at Diavik Diamond Mine and building on the success of the 104kW solar installation in Fort Simpson, renewable energy options will play an increasing role in our electricity supply. Through the NWT Solar Strategy, the GNWT has established a target to displace diesel electricity generation with solar, that could see power plants turned off for periods in the summer. The goal will be achieved through a number of initiatives including the development of a net metering policy, community scale solar/diesel hybrid installations and a generous incentive program.
- It is well understood that the best investment in our energy future is in improving efficiency. This is why we have renewed our funding programs that support individuals and communities to make investments in this area. Our remote communities will benefit the most from these investments and this is why we have enhanced our funding to the Arctic Energy Alliance's regional energy advisors who will now have offices in the Beaufort Delta, Sahtu, Tłı̨chǫ, Dehcho and South Slave regions.

With a clear direction to achieve a brighter energy future we are confident that the Northwest Territories Energy Action Plan will build on past success and move the Territory in the right direction in the short term. The Power System Plan will set the long term direction to transform our energy system.

We would like to express our appreciation to residents, communities and all Members of the Assembly that have contributed to the development of the Action Plan. We are confident that it will work towards achieving the broader priorities of the 17th Legislative Assembly and that it recognizes the energy future we all aspire to.

Honourable
Robert (Bob) McLeod

Honourable
Michael Miltenberger

Honourable
David Ramsay

Honourable
Tom Beaulieu

EXECUTIVE SUMMARY

The Northwest Territories Energy Action Plan (Energy Plan) represents an investment of just over $31 million in funding into energy programs, projects and policies over three fiscal years. In this Energy Plan, the GNWT has committed to complete 33 distinct 'actions' that will help our Territory develop more efficient and environmentally-friendly energy systems and support residents and communities to reduce their own energy use. These 33 actions have been grouped into four 'Action Areas':

- Energy Conservation and Efficiency;
- Energy Supply;
- GNWT Leadership; and
- Policy and Planning.

All of the actions are designed to reduce energy costs, the use of imported oil, and greenhouse gas emissions in the NWT. Key objectives include:

- Ensure reliable energy supply;
- Improve affordability;
- Reduce environmental impacts;
- Maximize the economic benefits of our energy systems;
- Optimize the use of Government resources; and
- Continue to engage community and Aboriginal governments in planning initiatives.

These actions and objectives were developed in consultation with the Aboriginal and community leaders, residents, businesses and NGOs of the NWT through the 2012 Northwest Territories Energy Charrette planning process. The Charrette brought together 125 stakeholders from across our territory to address some of the most pressing energy challenges we face today. The GNWT further commits to this innovative form of public engagement through collaborative policy development in this Energy Plan.

Below is an overview of the actions that will be pursued over the next three fiscal years.

ENERGY CONSERVATION AND EFFICIENCY

The GNWT is committed to helping northerners increase efficiency in their energy use, and over the next three years will work with stakeholders from the utility to the household level in order to make improvements in this area. Energy Efficiency is typically the most economic investment that can be made in terms of decreasing energy costs and mitigating the impacts of our energy use on the environment.

The Arctic Energy Alliance (AEA) is the lead GNWT agency helping residents and communities to reduce the cost and environmental impacts of their own energy use. Through this Energy Plan, the GNWT expands its commitment to this agency and its programs, mostly to increase the AEA's presence in smaller communities and enhancing AEA programs. Program enhancements include renewed commitments to the Energy Efficiency Incentive Program, the Commercial Energy Conservation and Efficiency Program, the Energy Conservation Program, and the Energuide Program. In addition, in 2013-14 the GNWT is investing in a pilot project for the newly created Hot Water Heater Replacement Program to help rural communities convert away from inefficient hot water heaters – resulting in significant cost savings for households.

Lastly, working with NTPC, the GNWT will continue to search for ways to reduce diesel consumption in thermal communities. This will include increasing alternative and renewable sources of energy and investments in technology such as the use of smart grid technology and installing load dispatch controls on diesel generation units, as discussed below.

ENERGY SUPPLY

Much of the work in this area is being conducted by the Northwest Territories Energy Corporation (NT Energy), the GNWT's lead energy project developer. NT Energy develops business opportunities for NTPC and assists the GNWT in meeting its overall energy objectives. NT Energy is the project leader for the Power System Plan that provides a 20-year outlook for developing the necessary infrastructure to transform electricity supply to communities, business and industries in the NWT.

In order to promote biomass energy resources, the GNWT will continue to implement the Biomass Energy Strategy through the Department of Environment and Natural Resources (ENR). Major projects include, funding household and small business-scale biomass projects through the Alternative Energy Technology Program (AETP), funding for the promotion of biomass solutions for communities, and development of our forestry resource and industry in order to promote the use of the local supply of biomass.

The GNWT will continue to build upon its successes in the solar energy field through the development of at least one remote solar-diesel hybrid system in Colville Lake. This system will be further strengthened through the development of a sizeable battery bank storage system and load dispatch controls made possible through a 'smart grid technology' program operated by Natural Resources Canada. This technology will be extended to other communities in the following years.

As for wind energy, the GNWT is now focusing its efforts on developing the proposed Storm Hills project outside of Inuvik. A pre-feasibility study indicates that for a small subsidy, 18.5% of Inuvik's annual load can be met with a 1.8 megawatt (MW) turbine. The GNWT will continue to monitor the local wind regime, and investigate avenues for decreasing the cost of required infrastructure needed to make the project a success. The project will require three to six years for development.

Lastly, LNG presents an opportunity for the NWT. NT Energy is currently developing an LNG supply chain in Inuvik. By mid-2014 nearly 65% of Inuviks electricity demand can be met by LNG, thus displacing diesel, reducing costs and GHG emissions. Further projects are being developed to convert existing diesel generators to natural gas for Fort Simpson and other road-connected communities in the Dehcho.

GNWT LEADERSHIP

The GNWT has made tremendous strides in reducing its carbon footprint since the launch of the last energy plan in 2007. The Government is able to lead the way on energy and help create new markets for energy products, resources and services.

Through this Energy Plan the GNWT is re-committing to the Capital Asset Retrofit Fund (CARF), which will make heating, ventilation and air-conditioning (HVAC) upgrades in Government facilities in **Behchokǫ̀**, Fort Simpson, Hay River, Tsiigehtchic and Sachs Harbour. This saves taxpayer money, creates environmental benefits and spreads best practices across the regions.

The GNWT is recognized as a national leader in the deployment of commercial-scale biomass heating systems within its facilities. These initiatives have helped the GNWT save millions on energy expenditures, and have helped to create biomass supply chains in various regions of the NWT. The GNWT will develop new biomass heating systems in Norman Wells and develop plans to extend the biomass supply chain across the NWT.

Lastly, the GNWT is committed to providing building upgrades and biomass and solar energy solutions for residents who rely on public housing.

POLICY AND PLANNING

All of the actions outlined above require strong, clear policy signals from Government. The GNWT will research best policy practices and communicate clearly on major energy issues in order to create a coherent energy policy environment in the NWT.

Major forthcoming initiatives include:

- The GNWT will work with leading researchers from the Institute for Sustainable Energy, Environment and Economy at the University of Calgary to develop a suite of comprehensive key performance indicators for energy. This will help the GNWT monitor the progress of its energy policies and improve future decision-making processes.
- The GNWT will begin to issue strategic direction to NTPC through an annual shareholder letter of expectation. The GNWT will work collaboratively with this crown corporation to establish a clear accountability framework, in order to ensure that energy objectives are being met.
- The GNWT will work with the Public Utilities Board (PUB) to consider amendments to the Public Utilities Act in order to assure the Government's ability to issue policy direction to the Board, thus improving the coordination of efforts on the regulation of public utilities in the NWT.
- The GNWT will support the establishment of a net-metering policy for the NWT in early 2014 for the NWT, helping residents and businesses connect small-scale electricity projects to the grid to offset their bills. This will also include adjusting the stand-by rate to accommodate the integration of small scale renewables such as solar photovoltaic (PV).
- The GNWT will release a policy review on approaches to energy efficiency standards later in 2014..

In addition, the GNWT is making new commitments to increase energy literacy, and research innovative financing mechanisms to help residents and businesses finance upgrades.

SUMMARY

This Energy Plan builds on past successes, integrates emerging best practices, and positions NWT residents, communities and businesses to benefit directly from an array of energy programs, projects and policies. This Energy Plan recognizes that solutions to the NWT's energy challenges must be designed and implemented by northerners. This is an appropriate approach as the people of the NWT prepare for new responsibilities in lands and resource management pursuant to the Final Devolution Agreement between the GNWT, the federal government and Aboriginal governments, to be implemented on April 1, 2014.

The Snap Lake Mine has 14.5MW of diesel capacity installed.
Source: ITI/GNWT

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY 1

2. INTRODUCTION 7

2.1. Purpose 7

2.2. Challenges 8

2.3. Opportunities 8

3. THE NWT ENERGY CONTEXT 9

3.1. Utility Cost Structure 11

4. ENERGY PLAN OBJECTIVES AND PERFORMANCE INDICATORS 13

4.1. ENERGY PLAN OBJECTIVES 13

4.2. PERFORMANCE INDICATORS 15

5. GNWT ENERGY POLICY 17

6. OTHER GOVERNMENT PLANNING EFFORTS 21

6.1. Northwest Territories Power System Plan 21

6.2. Linkages to Mineral Development Strategy and Economic Opportunities Strategy 23

7. ACTION AREAS 25

7.1. SUMMARY OF ACTION ITEMS 26

7.2. ENERGY CONSERVATION AND EFFICIENCY 29

7.2.1. Funding the Arctic Energy Alliance 29

7.2.2. Energy Conservation and Efficiency Programs 30

7.2.3. Electric Hot Water Heater Replacement Program 31

7.2.4. Power Plant Residual Heat Projects 31

7.2.5. Transportation 32

7.3. HYDRO 33

7.3.1. Whatì Transmission Line 34

7.3.2. Kakisa and Fort Providence Transmission Line 34

7.3.3. Water Monitoring / NWT River System Inventory 35

7.3.4. Large-Scale Transmission Planning 35

7.3.5 Great Bear River Mini-Hydro Project 36

7.4. BIOMASS 36

7.4.1. Funding for Biomass Projects 37

7.4.2. Biomass Production, Community Engagement and Project Evaluation 37
7.4.3. Forest Resource and Industry Development Activities 38
7.5. SOLAR ENERGY 38
7.5.1. Solar PV Electricity Generation 39
7.5.2. Smart Grid Technology 40
7.6. WIND ENERGY 40
7.6.1. Storm Hills Wind Project 41
7.6.2. Wind Monitoring 41
7.7. LIQUEFIED NATURAL GAS 42
7.7.1. Introduce an LNG Supply Chain into the Beaufort Delta 43
7.7.2. LNG Conversion in the Thermal Zone 43
7.8. INNOVATION 44
7.8.1. Geothermal Feasibility 44
7.8.2. The Alternative Energy Technology Program 45
7.8.3. Electric Vehicle Demonstration Project 45
7.9. GNWT LEADERSHIP 46
7.9.1. Capital Asset Retrofit Fund 47
7.9.2. Biomass Heating Systems 47
7.9.3. Energy Efficiency Upgrades for Public Housing 48
7.10. POLICY AND PLANNING 48
7.10.1. Issue Strategic Direction to NTPC and Implement an Accountability Framework 49
7.10.2. Reaffirm the role of the Public Utilities Board 50
7.10.3. Develop Energy Performance Indicators and Reporting 50
7.10.4. Establish a Net Metering Renewable Energy Policy 51
7.10.5. Adjust Stand-by Rate Policy 51
7.10.6. Investigate the Establishment of an NWT Energy Efficiency Act 52
7.10.7. Commitment to Collaborative Policy Development 52
7.10.8. Promote Energy Literacy 53
7.10.9. Research Innovative Financing Mechanisms 53
7.10.10. Northwest Territories Energy Corporation – Core Funding 54
8. CONCLUSION 55
9. APPENDICES 57
Appendix A: Subsidies 57
Appendix B: Power System Plan Action Areas Summary 58

2. INTRODUCTION

2.1. PURPOSE

This Energy Plan guides the Northwest Territories (NWT) towards a future where we have more sustainable communities, where we use our energy more efficiently and have developed our own local energy sources that are cleaner, and in the long-term, less expensive. This future will be one in which our energy use has less impact on our environment and where we are less reliant on imported oil. To accomplish this, the Energy Plan lays out a Three-Year Action Plan for the generation, transmission and use of energy in the NWT.

Strategic energy planning is an essential part of reaching this vision of the future. As early as 1980, the Government of the Northwest Territories (GNWT) developed an energy strategy with actions to improve energy conservation and efficiency and to develop more of the NWT's hydroelectric resources. The basic challenges from that era remain today, but changes in technology and strategy are producing positive results and creating optimism for communities that hope to transform their energy status quo.

This Energy Plan places a renewed focus on energy conservation, efficiency, and using more of the NWT's renewable resources to displace imported fuels. Reducing greenhouse gas (GHG) emissions is a priority of this plan and there are now more options than ever for achieving this goal. Biomass, liquefied natural gas (LNG), geothermal, solar and wind projects are being investigated for various communities in the NWT. Strong momentum in these areas has already yielded technology-specific strategies. As such, the GNWT has already produced the *Northwest Territories Biomass Energy Strategy, the Northwest Territories Solar Energy Strategy,* and *A Greenhouse Gas Strategy for the Northwest Territories.* These three strategies are all closely linked to this Energy Plan.

This Energy Plan was developed in tandem with the NWT Power System Plan, an initiative being led by NT Energy – the GNWT's energy development crown corporation. A new collaborative process was used to develop this Energy Plan. The 2012 Northwest Territories Energy Charrette brought together approximately 125 energy stakeholders from across the NWT and Canada to pinpoint issues, identify key objectives, and develop short- and long-term solutions. Perhaps the most important outcome of this Charrette was a list of key objectives that participants created, and which have been largely adopted for this Energy Plan. The GNWT also took away many recommendations for policies, programs and projects that have been incorporated into this document.

This Energy Plan presents a picture of the NWT's energy use today, as well as an overview of important GNWT policies, before itemizing 33 'action items' the Government is committed to pursuing during the next three fiscal years. For more information on the 2007 Energy Plan, as well as GNWT programs, policies and projects, please visit: **www.nwtenergy.ca**.

2.2. CHALLENGES

The small scale of the NWT's communities, harsh environment and vast distances contribute to the high cost of energy in the Territory.

We use energy every day to light and heat our homes and businesses, to run equipment and to transport people and products to and from our communities. The cost of energy and utility services in our communities is very high compared to most other regions of Canada. These high costs negatively impact the NWT economy and drive up the cost of living in our communities.

The main factor behind high energy prices is the issue of economies of scale. Very small communities, with very small loads lead to very high capital costs for providing these communities with electricity and heating fuel services. Our harsh environment, and vast distances between communities also mean that it is critical that substantial infrastructure is in place to ensure continuous energy supply. For instance, all power plants in the NWT have a fully redundant back-up system, as communities cannot rely upon a grid. This adds to the cost of construction and maintenance of such facilities.

These challenges have been compounded by issues such as the diminishing natural gas resources in Inuvik and Norman Wells, slow progress in the financing and development of new hydro resources, and the difficulty of supplying wood pellets to remote communities. All of these factors contribute to energy costs that remain relatively high across the NWT.

2.3. OPPORTUNITIES

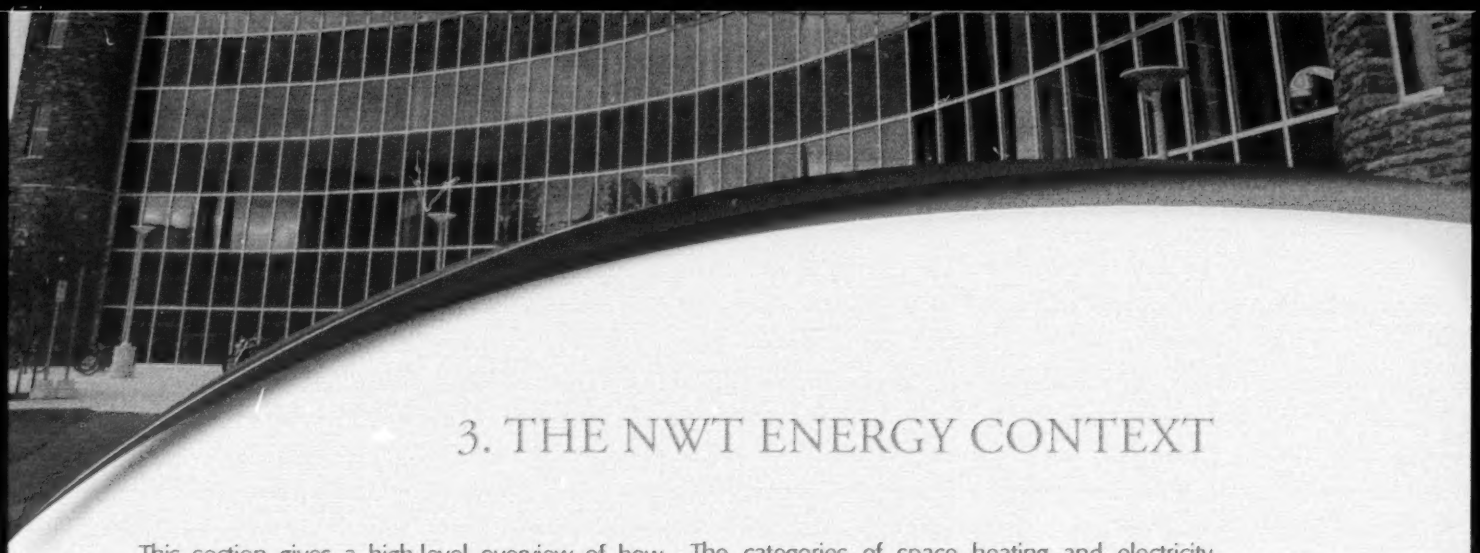
As a result of new and improved technologies, greater public awareness, and Government investment, the NWT is making progress in using energy more efficiently and in developing local and renewable energy sources which will, over time, lead to lower energy costs and reduced impacts on our environment.

There have been key successes in recent years including a substantial increase in the use of wood pellets for heating, progress in advancing potential hydro and transmission projects, and improved programs and actions on energy efficiency for government assets, businesses and residents. Wood pellets are now used for heating in almost all communities with all-season road access, and pellet supply chains are being established in some of the more remote communities. Utility-scale wind energy has also come to the NWT, as the 9.2MW Diavik wind farm was commissioned in December 2012.

The success of these initiatives can be measured in GHG reductions: in 2007, the GNWT adopted a target to reduce its corporate emissions by 10% below 2001 levels and by 2011 had achieved a 30% reduction. The GNWT has also made significant progress in reducing the cost of living in many of our smaller communities through the 2010 'Electricity Review' that made rates more equitable across the NWT.

The GNWT has reduced corporate emissions by 30% below 2001 levels, surpassing its 10% goal.

The GNWT believes that the 33 actions described below present key opportunities that must be seized in order to achieve the NWT's energy objectives.

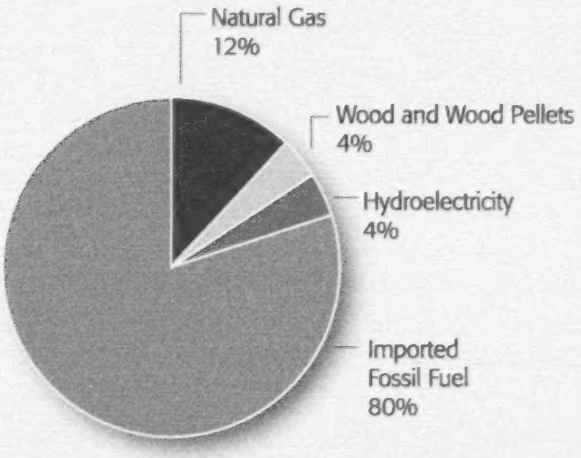


3. THE NWT ENERGY CONTEXT

This section gives a high-level overview of how energy is used in the NWT. Fossil fuels remain the dominant energy resource used in the NWT. Energy Supply in 2011/2012 is shown in Figure 1. Note that the use of natural gas is declining due to supply shortages in Norman Wells and Inuvik, while the use of wood pellets for space heating is increasing across much of the territory.

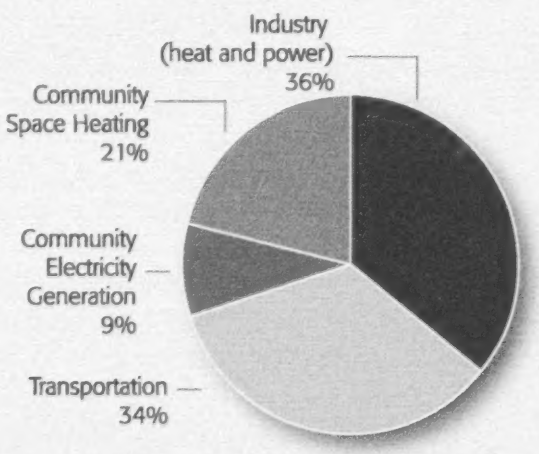
Figure 2 shows how much energy is used by various sectors in the NWT. The industrial sector includes energy use outside of communities by mines, exploration camps, and oil and gas development activities including energy use for their electricity. The categories of space heating and electricity generation are within communities. Transportation covers all on-road and off-road transportation, as well as aviation fuel. Industry consumes the largest portion at 36% of total energy use, while transportation uses 34% and space heating 21%. Community electricity generation only accounts for 9% of all energy consumption in the NWT, of which 74% is generated in the Territory's hydro facilities (Figure 3). However, when industrial electricity is included hydro only accounts for 32% of the profile (Figure 4)

Figure 1: NWT Energy Supply (20.6 Million GJ in 2011/12)



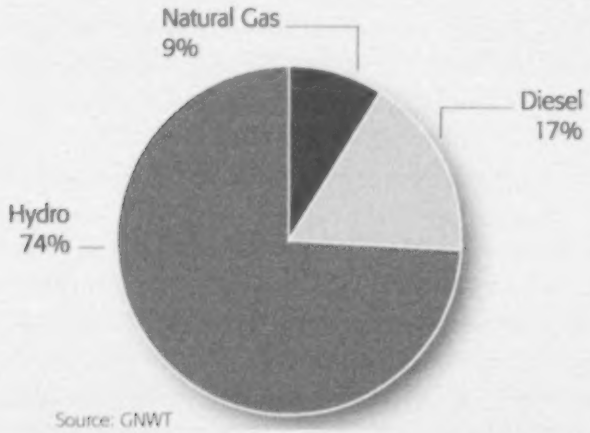
Source: GNWT

Figure 2: NWT Energy Use by Sector (20.6 million GJ in 2011)



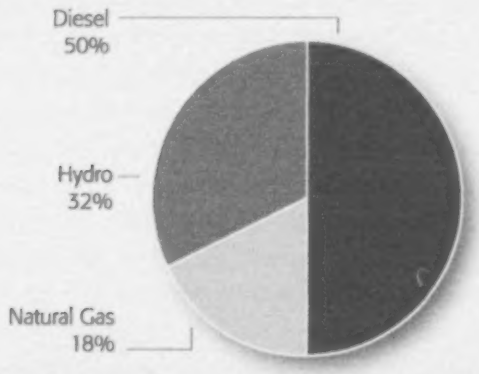
Source: GNWT

Figure 3: Community Electricity Generation 2010 (Total Consumption 309,045MWh)



Source: GNWT

Figure 4: NWT Electricity Generation Including Industrial Consumers 2010 (Total Consumption 722,675MWh)

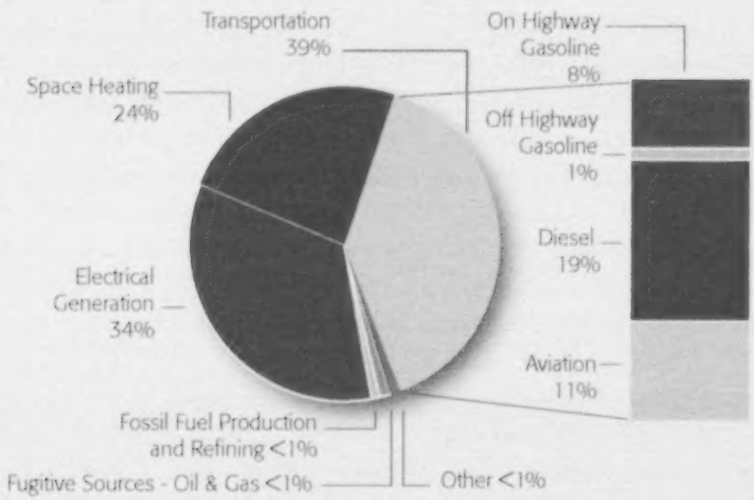


Source: GNWT

GHG emissions in 2011 were 1,420 kilotons (kT), which results almost entirely from electricity generation, space heating, and transportation. GHG emissions are shown in Figure 5.

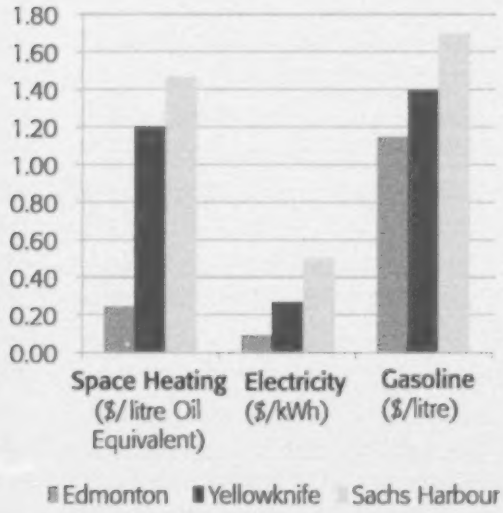
Energy costs in the NWT are substantially higher than in other parts of Canada. To demonstrate this, energy costs in Yellowknife, Sachs Harbour, and Edmonton are compared in Figure 6. Space heating fuel in Sachs Harbour is seven times the price of natural gas sold in Edmonton; the disparity in the cost of heating in Sachs Harbour is further exacerbated by the fact that it has twice the heating degree days of Edmonton.

Figure 5: NWT GHG Emission Sources (1,290 kilotons in 2011/12)



Source: GNWT

Figure 6: Energy costs in Yellowknife and Sachs Harbour compared to Edmonton

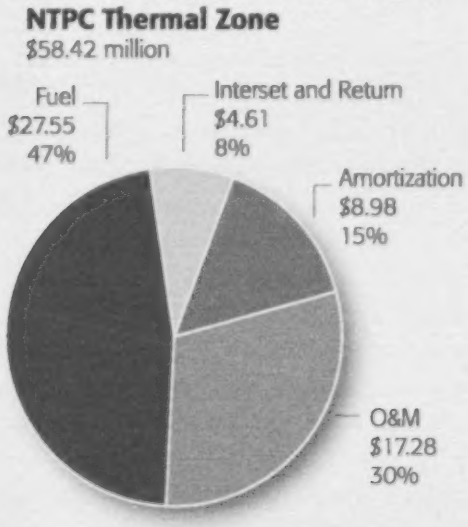


Source: Enmax website, Aug. 2013; Kent Marketing Services, Petroleum Price Data, Aug. 2013; GNWT, Petroleum Product Division, Aug. 2013; Arctic Energy Alliance, Fuel Cost Library, Aug. 2013

3.1. UTILITY COST STRUCTURE

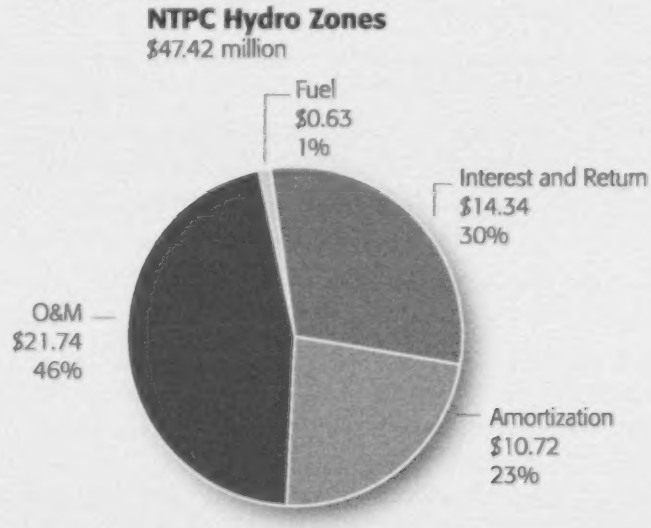
Currently, the NWT's two power utilities require a combined $124 million per year to operate. The cost structure of NTPC's hydro and thermal zones differ substantially, impacting operating costs and the pace of project development, as illustrated in Figures 7 and 8. The cost structures in the thermal zones are dominated by fuel costs (47%), tying rates to fluctuating global fuel prices – this has resulted in increased pressure on rates. On the other hand, the cost structures of the hydro zones are insulated from such fluctuations but bear higher capital related costs (53%). This is because hydro projects require large financial outlays up front to support the investment in dams and transmission lines. These initial outlays make it challenging to initiate projects because of the requirement to have a market in place to support the investment. In addition, hydro projects often require government backing. This challenge can be illustrated by both the length of time and the magnitude of resources necessary to develop hydro projects. Figure 9 illustrates NTPC total system cost structure.

Figure 7: NTPC Thermal Zone Cost Structure

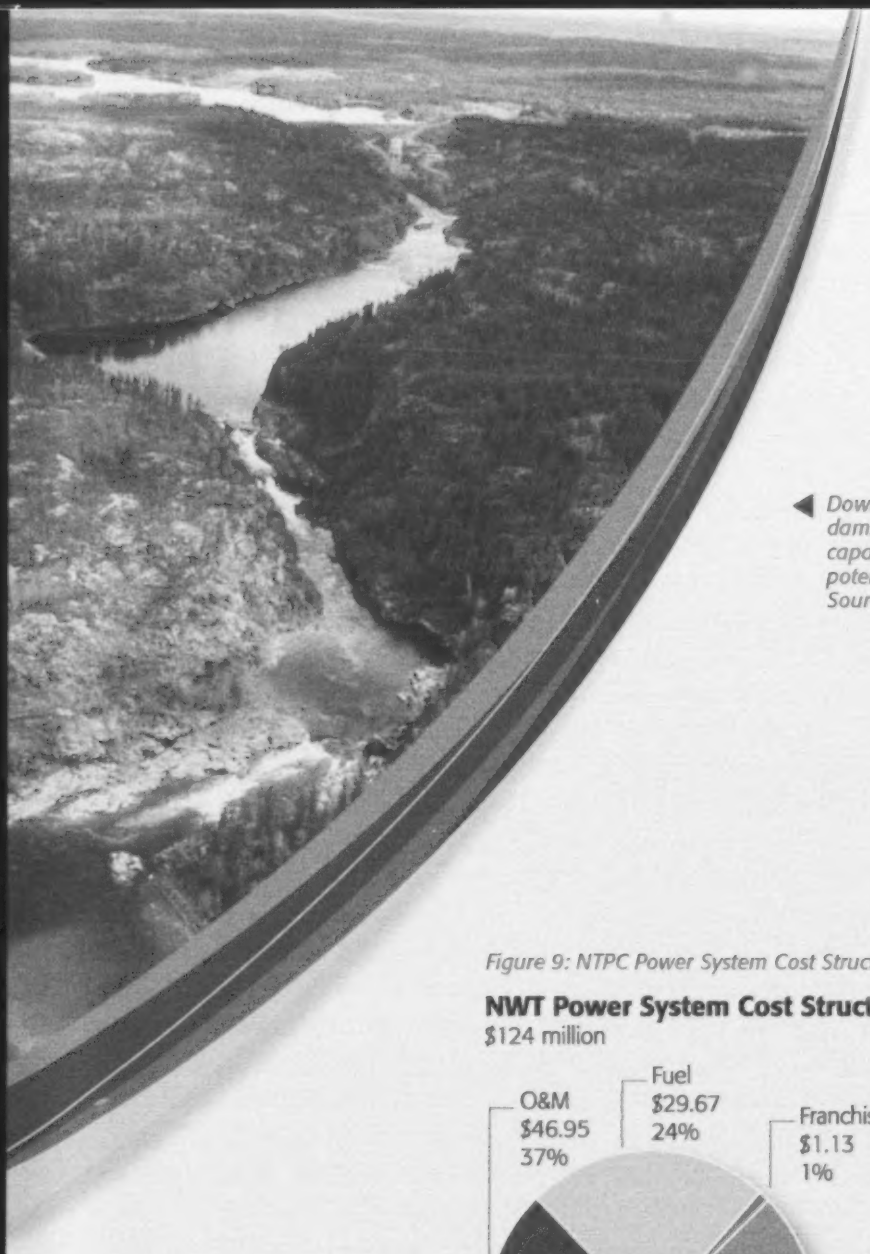


Source: NTPC 2012/14 GRA, April 19, 2013 Updated Compliance Filing

Figure 8: NTPC Hydro Zone Cost Structure



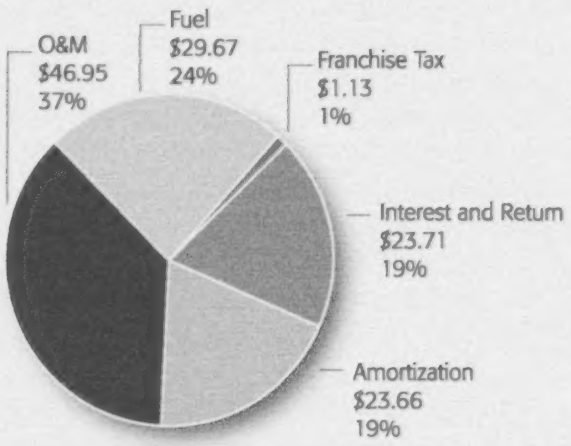
Source: NTPC 2012/14 GRA, April 19, 2013 Updated Compliance Filing



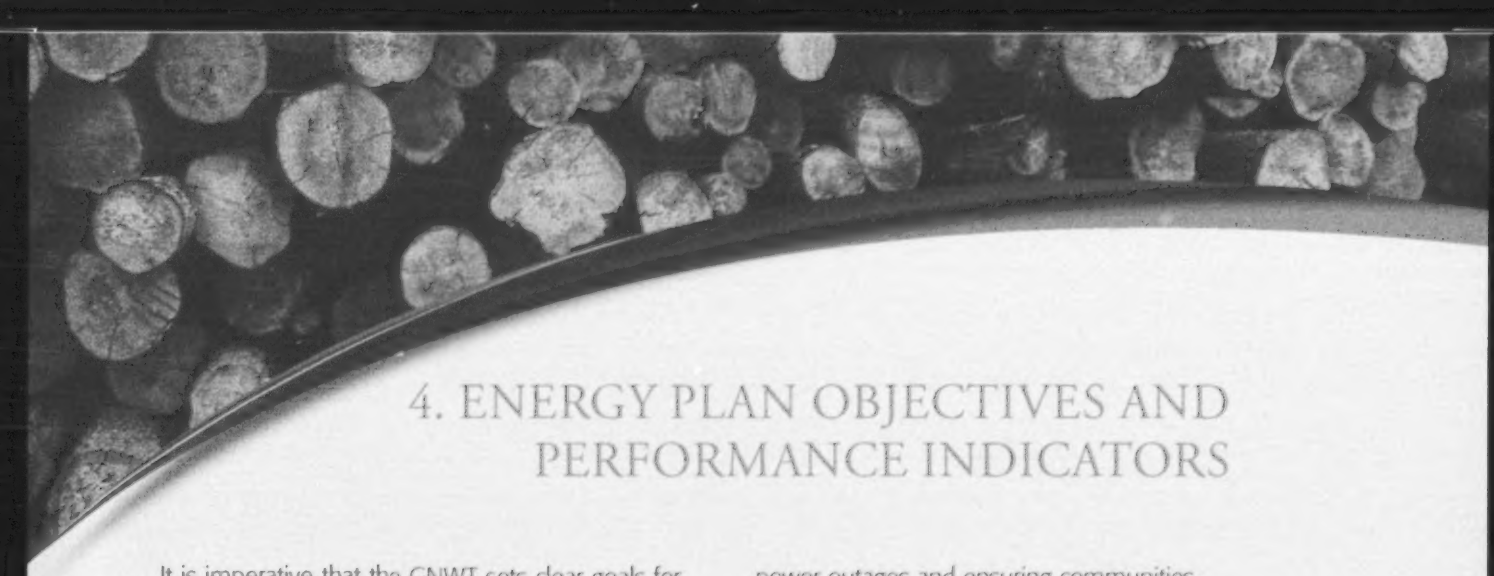
Downstream of the Taltson hydro dam. The facility has a built capacity of 18MW, with a future potential of 190MW.
Source: NTPC

Figure 9: NTPC Power System Cost Structure

NWT Power System Cost Structure (NTPC&NUL)
$124 million



Source: NTPC 2012/14 GRA, April 19, 2013 Updated Compliance Filing; NUL(YK) from Revised Schedule 1.1 of Decision 16-2011; NUL(NWT) from Appendix 1 of Decision 17-2011



4. ENERGY PLAN OBJECTIVES AND PERFORMANCE INDICATORS

It is imperative that the GNWT sets clear goals for energy planning and is able to track its progress in the achievement of these goals. The over-arching goal as established by Ministers in the preceding 'Ministers'Message' is:

> *Short term actions and long term planning for energy supply will be aimed at reducing energy costs, imported oil, and greenhouse gas emissions in the NWT through energy conservation, increased use of renewable energy, and enhanced energy infrastructure.*

Measuring the progress in reducing energy costs, the reliance on imported oil in our communities, and in reducing greenhouse gas emissions needs to be tracked and measured.

The supporting objectives below need to be approached in a balanced fashion. Trade-offs will need to be made when approaching each action of this Energy Plan. For example, the importation of LNG into the NWT to generate electricity does not promote the use of local energy resources, but the potential reduction in costs, GHG emissions, and the energy security that this resource may provide for communities such as Inuvik, will justify the trade-off.

4.1. ENERGY PLAN OBJECTIVES

The energy objectives of the GNWT were largely defined through the Charrette process, resulting in the following list of six overarching objectives for this Energy Plan:

- **Ensure reliable energy supply**
  The GNWT aims to improve the reliability and long-term security of energy supply. The word 'reliability' deals with both limiting power outages and ensuring communities have consistent access over the long-term to a dependable energy supply. The people of the NWT need safe and reliable access to energy to maintain viable communities. Long, harsh winters and the remoteness of our communities mean we need to plan carefully to keep the lights and heat on. This objective is reinforced by the energy supply situations facing Norman Wells and Inuvik.

- **Improve Affordability**
  Stabilizing the cost of energy and maintaining fair and equitable prices across the NWT constitute a primary focus of this Energy Plan. Addressing the cost of energy will ensure that individuals can shift more of their disposable income to other priorities. Finding solutions to reduce the cost of energy for small businesses, industry and the natural resource sector will stimulate investment in these sectors, creating jobs, revenues for governments and legacy infrastructure.

- **Reduce environmental impacts**
  It is important that this Energy Plan works towards reducing GHG emissions and other environmental impacts on air, land, and water caused by the production, transmission and use of energy. Stakeholders have consistently called for the protection of the environment. This objective is strongly in line with the goals set out by the NWT Greenhouse Gas Strategy, and other priorities of Government.

> *Combustion of natural gas, including in its liquid state results in 30% less direct greenhouse gas emissions than diesel, per unit of energy.*

Stakeholders from across the NWT gathered at the 2012 Energy Charrette to discuss energy issue important to their communities. Over 125 delegates were in attendance. Source: ITI/GNWT

- **Maximize the economic benefits of our energy systems**

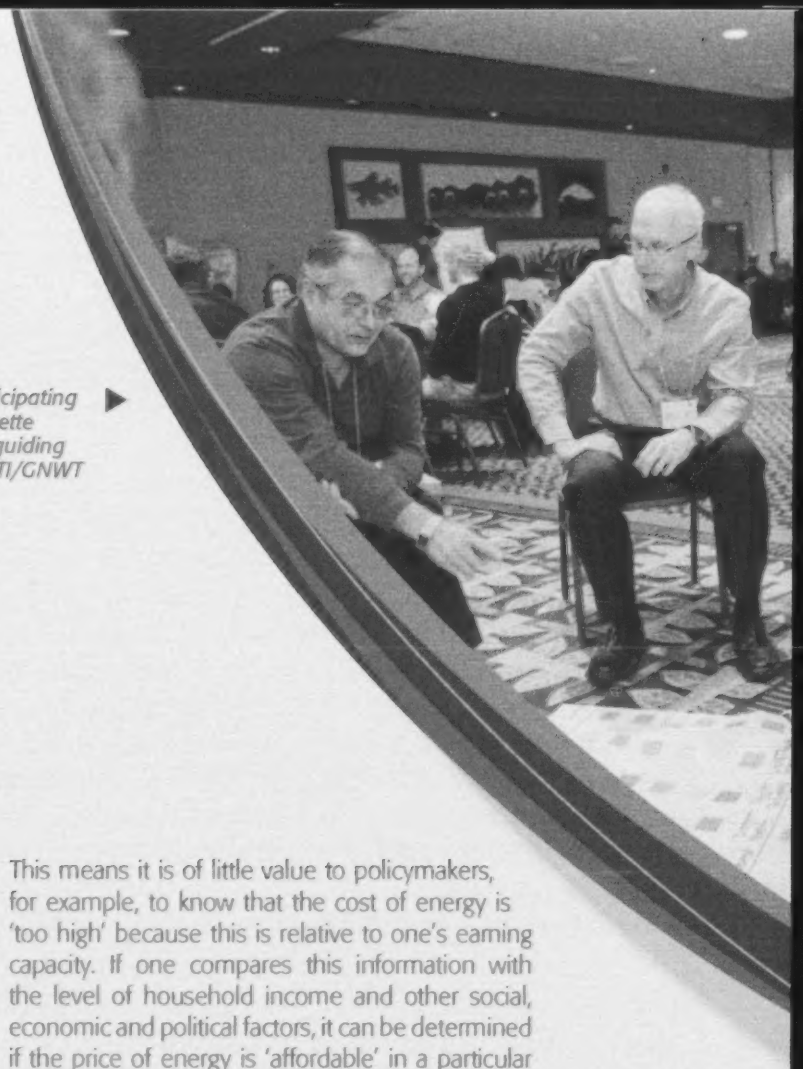
  Encouraging economic development in the local and renewable commercial energy sector will create local jobs and encourage import substitution. Developing local employment derived from the energy industry adds to our economy. Utilizing local resources recirculates money in the local economy versus the money flowing out of the NWT when petroleum products are imported into the Territory. Also, serving emerging and existing industry with hydroelectricity can keep energy dollars inside the territory and help to reduce GHG emissions.

- **Optimize the use of Government resources**

  This Energy Plan will endeavour to maximize the efficiency of public funds to best achieve energy priorities. The GNWT will manage costs by ensuring that only the most effective actions are pursued. Federal grant dollars will be pursued when available. In addition to energy programing and projects, the GNWT spends roughly $30-million annually (as well as a recently allocated $34-million injection into the power system between 2012-15) to subsidize the cost of energy for residents and businesses to ensure affordability. Managing and reducing this subsidy cost is a long-term priority.

- **Continue to engage community and Aboriginal governments in planning initiatives**

  The GNWT will ensure that communities and Aboriginal governments are involved in energy planning decision making processes. Community and Aboriginal leaders played a key role in the development of this Energy Plan. The GNWT and its agencies will continuously engage with community and Aboriginal governments and organizations to ensure that the public interest in energy planning is central to all actions taken by the GNWT.



Energy stakeholders participating in the 2012 Energy Charrette discussed the objectives guiding the Action Plan. Source: ITI/GNWT

4.2. PERFORMANCE INDICATORS

Reaching the objectives laid out in this Energy Plan will require a balanced use of resources, technologies, incentives and policy planning. It will also require regular monitoring of the impacts of selected policies and strategies to see if they are achieving intended results. Policymakers need to understand the current status of the energy environment in the NWT, as well as what emerging priorities are in order to achieve desired results. This is the purpose of energy performance indicators.

The International Energy Agency (IEA) has issued guidelines for the development of energy performance indicators in its recent publication, *Energy Indicators for Sustainable Development: Guidelines and Methodologies*. As the publication asserts:

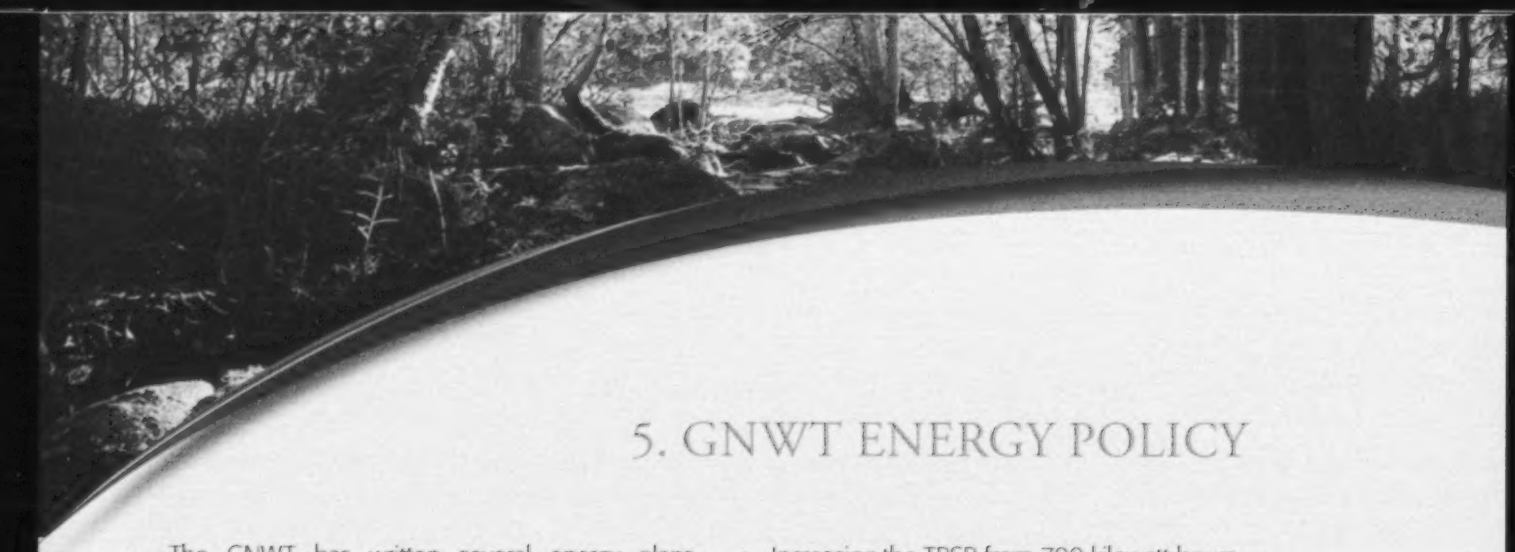
> *"...indicators are not merely data; rather they extend beyond basic statistics to provide a deeper understanding of the main issues and to highlight important relations that are not evident using basic statistics. They are essential tools for communicating energy issues related to sustainable development to policymakers and to the public, and for promoting institutional dialogue. ... Changes in the indicator values over time mark progress or lack of progress towards sustainable development."*[1]

This means it is of little value to policymakers, for example, to know that the cost of energy is 'too high' because this is relative to one's earning capacity. If one compares this information with the level of household income and other social, economic and political factors, it can be determined if the price of energy is 'affordable' in a particular community when tracked over time.

As illustrated in Table 1, the GNWT has started to develop performance indicators and measurement criteria that will track progress and better inform the energy planning process. This work will be further refined through a relationship with the University of Calgary and their applied decision research group. See Action Area 7.10.3 *'Develop Energy Performance Indicators and Measurement Criteria'* for more information on how the GNWT will move forward in this important area.

1. "Energy Indicators for Sustainable Development: Guidelines and Methodologies", a publication of the International Atomic Energy Agency, online: *International Atomic Energy Agency* <http://www-pub.iaea.org/MTCD/publications/PDF/Pub1222_web.pdf>.

Table 1 - Energy Performance Indicators		
Objectives	**Sub-Objective**	**Performance Indicator**
Reliability	Improve Power Reliability	Duration and number of power outages by community
	Secure, long-term energy supply (Diversification)	Increases in Local and Renewable Energy Production
Affordability	Stabilize energy expenditures	Energy cost trends in communities
		Energy price trends in communities
Environmental	Reduce GHG emission intensities	GHG emissions by source
Optimize Government Resources	Optimize government investments	GNWT dollars invested per GHG reduction
		Dollars return on energy investment
Community and Aboriginal Involvement	Incorporate into decision making process	Outreach/engagement of community and Aboriginal governments
		Outreach/engagement of Youth
General		
Energy supply by energy type		
Energy use by sector		
Energy data by community		



5. GNWT ENERGY POLICY

The GNWT has written several energy plans and strategies since it assumed control over the governance of power generation in 1988. During the Charrette, energy policy issues received a great deal of attention and consideration. This Energy Plan provides an opportunity to compile the GNWT's policy positions established in the past and respond to some policy questions raised during the Charrette.

The 2007 Energy Plan, the NWT Greenhouse Gas Strategy, the 2010 Electricity Review, and other GNWT energy policy and planning publications have established a number of key energy policy positions over the years. These policies guide GNWT actions and as such serve as operating principles for the GNWT and its agencies. Below is a summary of key policy positions.

All NWT communities will have a comparable level of access to affordable power. The 2007 Energy Plan described electricity as an "essential service" for communities, and laid out the GNWT's commitment to ensuring that all communities have a comparable level of access to affordable power. The 2010 Electricity Review implemented substantial changes in the approach to electricity rates and the Territorial Power Subsidy Program (TPSP) to improve the level of access to affordable power in NWT communities. These changes included:

- The establishment of rate zones – including a 'thermal' zone – through which electricity rates were lowered in all thermal communities;
- Rationalization of the allocation of utility overhead costs, resulting in a simplified, more transparent and equitable approach to electricity rates; and
- Increasing the TPSP from 700 kilowatt hours per (kWh) month to 1,000kWh per month during winter months. The TPSP subsidizes all residents to the electricity rate in Yellowknife for up to 1,000kWh per month.

The GNWT remains committed to providing a comparable level of access to electricity services in NWT communities.

The Northwest Territories Power Corporation will maintain existing economies of scale, maximize efficiencies, and preserve other benefits of public ownership.

NTPC is publicly owned and is the primary power provider in the NWT. The crown corporation's economies of scale ensure that customers are offered the lowest prices possible. Other benefits of this crown corporation include maintaining northern jobs, as well as the ability to establish the direction of power generation and distribution services in the NWT. NTPC serves the public interest; recent examples (related to 'equitable' power as discussed above) include GNWT deferral of dividends from NTPC and the reduction of profit in NWT thermal communities. These actions were taken to improve affordability in NWT communities.

Previous reviews, including the Electricity Review and a separate review of NTPC in 2010, have not identified any potential benefits with 'breaking up' NTPC into a number of smaller companies. This will not address our largest challenge – a lack of economies of scale.

Hydroelectric generation projects on Aboriginal lands will be developed in partnership with Aboriginal governments.

While the GNWT seeks to maintain public control and ownership of electricity generation and transmission, future hydroelectric projects will be developed in partnership with Aboriginal governments where a business case exists. For example, the Snare Cascades hydro facility was developed with the Dogrib (Tłı̨chǫ) Power Corporation. This project required no substantial public subsidy and had a market in the customer base of the North Slave region. In cases where large public subsidies are required, the GNWT will need to ensure that the benefits from the public investment accrue broadly to the public and the electricity ratepayers making the investment.

The NWT's electricity transmission network will remain under public control.

The NWT's transmission network is small compared to those in southern jurisdictions, but it constitutes a vital piece of infrastructure that will help shape the future development of our Territory, and the ability to grow our economy. Control over these assets will allow the GNWT and its agencies to protect the public interest in the governance of energy resources and economic development. The GNWT will however, assess future proposed "merchant lines" on a case-by-case basis, whereby a project developer may own a transmission asset that is not vital to the network as a whole and serves only the 'merchant's' power needs.

Private sector partnerships can play a role in the development of major transmission lines. The key considerations from the GNWT's perspective are public control, and an eventual return to public ownership in transmission lines that may be proposed as public-private partnerships.

Proposed transmission lines to Whatì and Fort Providence, discussed later in this plan, require substantial subsidies. In these cases, where substantial public subsidies are required, a public ownership model will be pursued.

Incremental costs incurred in the development of alternative energy sources and other research and development projects will be funded by the GNWT and not transferred to electricity rates and/or communities.

The GNWT has made substantial investments in renewable and alternative energy projects in recent years. With high electricity costs, it is important that investments that will increase electricity rates over the 'status quo' in communities are made by the GNWT and not the electricity rate base. One example is the Fort Simpson solar power installation. The capital cost was largely paid by the GNWT, allowing the benefits of reduced diesel usage to flow to customers in the 'thermal zone'. The GNWT will continue to support the construction of such demonstration projects to foster innovation, diversify supply, and to prepare the NWT's power system for the future.

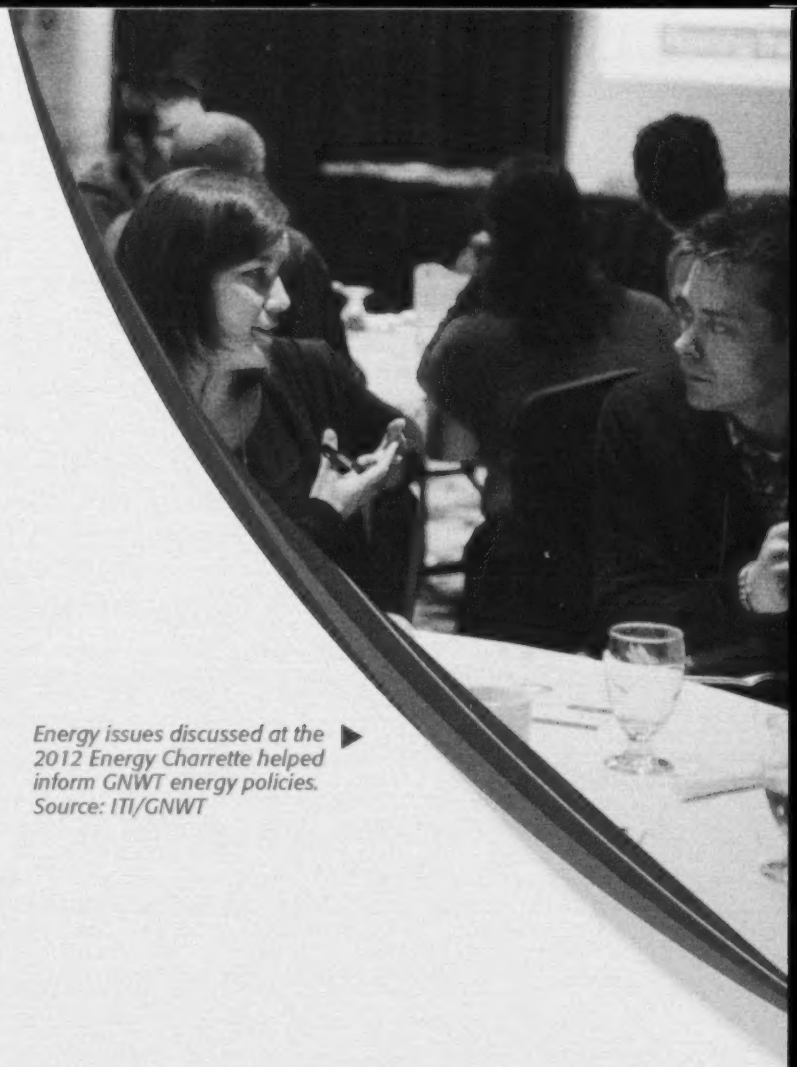
The GNWT will support the development of a locally sourced biomass fuel supply by giving priority to the procurement of locally sourced wood pellets.

The GNWT has made substantial investments in converting Government-owned facilities to wood-pellet heating system and is the largest purchaser of bulk wood pellets in the NWT. The GNWT will use this purchasing leverage to buy locally produced wood pellets as a way to further advance the goals of the Biomass Strategy.

The GNWT will continue to support actions to reduce emissions of GHG and remains committed to working with federal, provincial and territorial governments to reduce national GHG emissions.

The GNWT articulated this policy through the publication of the document, A Greenhouse Gas Strategy for the Northwest Territories. The strategy makes firm targets for GHG reductions:

- Stabilize emissions at 2005 levels (1,500kT) by 2015.
- Limit emissions increases to 66% above 2005 levels (2,500kT) by 2020.
- Return emissions to 2005 levels (1,500kT) by 2030.



Energy issues discussed at the 2012 Energy Charrette helped inform GNWT energy policies. Source: ITI/GNWT

The GNWT will protect the environment for future generations.

The GNWT lays out its commitment to protecting the environment broadly in its *Sustainable Development Policy.*

The Department of Transportation is also committed to reducing GHG emissions and other environmental impacts as laid out in its strategy, *Green Light: Signaling the Department of Transportation's Commitment to the Environment.*

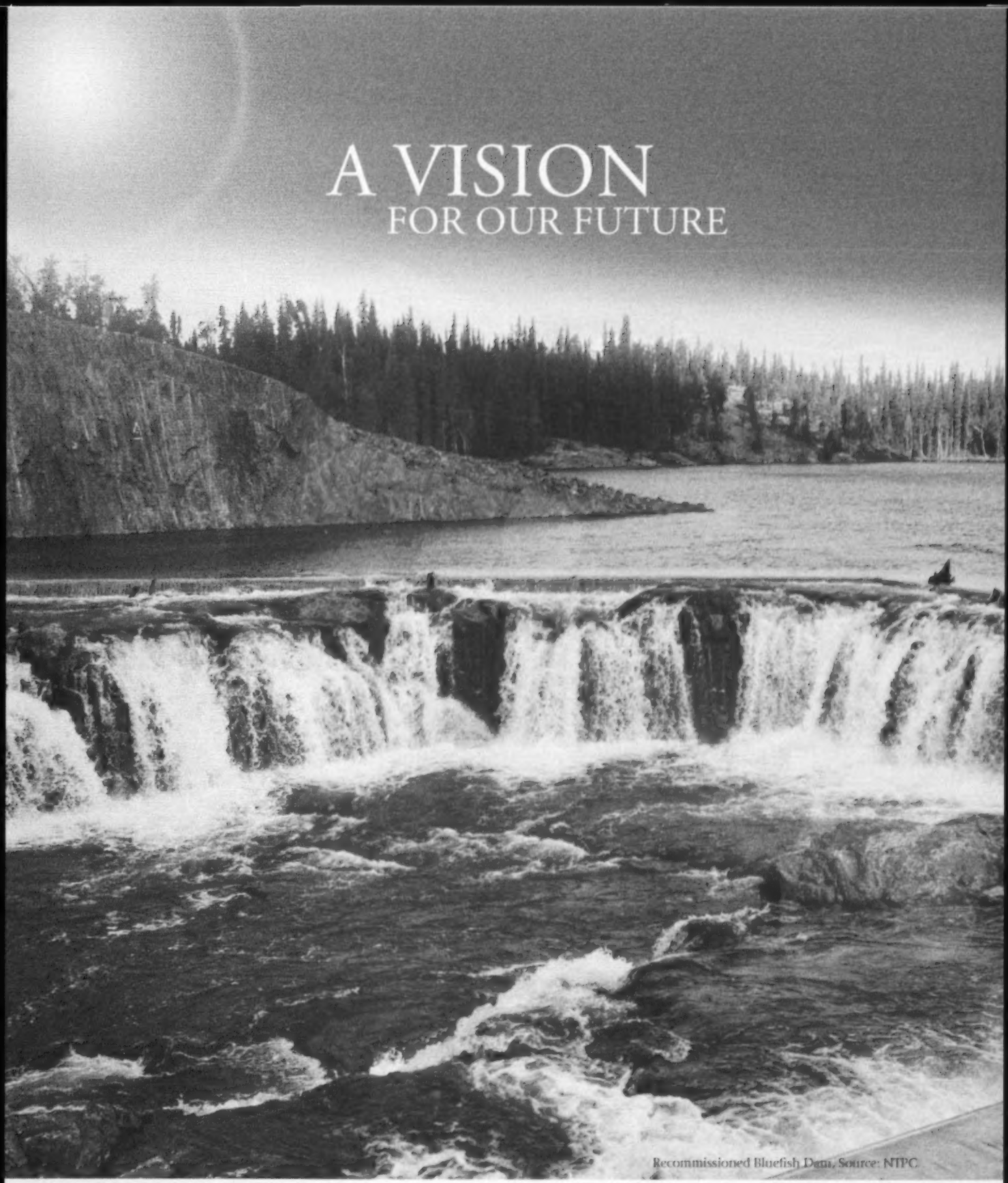
The GNWT, through the Northwest Territories Housing Corporation (NWTHC), is committed to the modernization of public housing units through improving energy efficiency, and reducing operating costs.

Through the strategic plan, *Building for the Future: Northern Solutions for Northern Housing*, the NWTHC lays out its plan for capital investment to develop multi-family units that will result in reduced operating costs, energy consumption and GHG emissions.

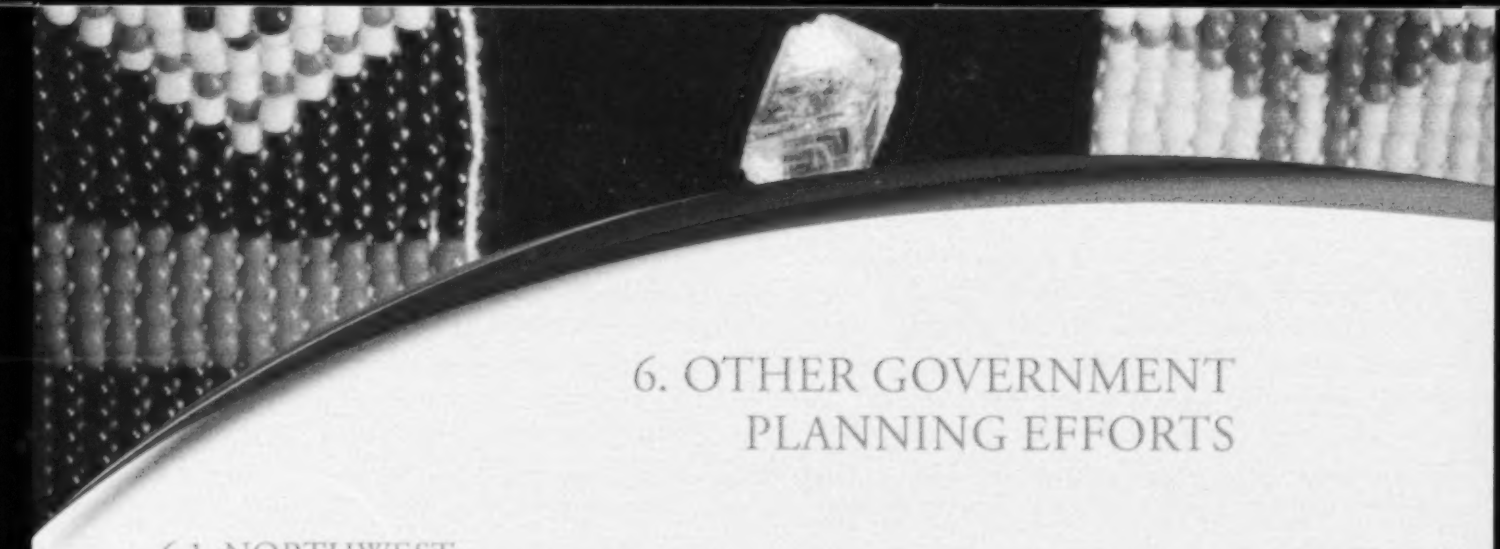
The GNWT will continue to lead in energy efficiency. This includes the planning, design, construction, and operation of Government buildings in support of this Energy Plan and the GHG strategy.

The GNWT will continue to lead by example by reducing its own energy use and carbon emissions, expanding the use of renewable energy at its facilities, and sharing its knowledge with individuals, communities and businesses. The GNWT pursues this policy through the CARF as well as other programs, administered by the Department of Public Works and Services.

A VISION
FOR OUR FUTURE



Recommissioned Bluefish Dam, Source: NTPC

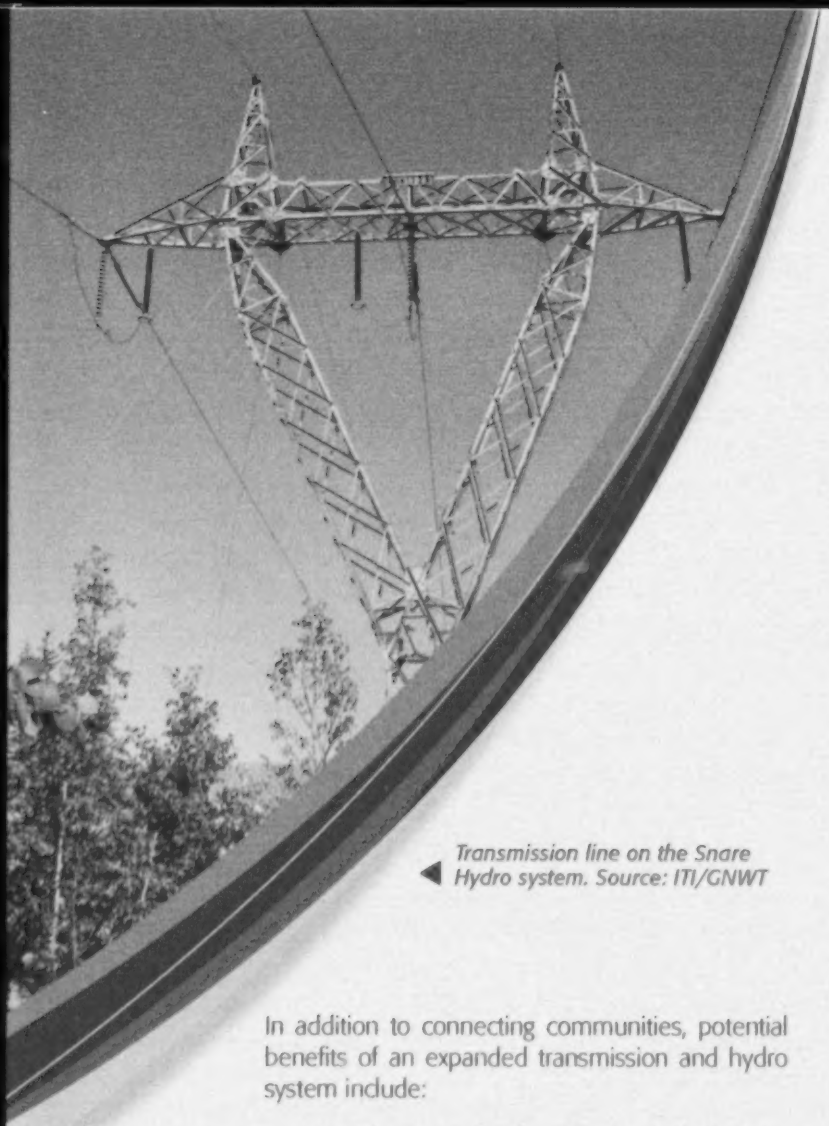


6. OTHER GOVERNMENT PLANNING EFFORTS

6.1. NORTHWEST TERRITORIES POWER SYSTEM PLAN

The Power System Plan provides a 20-year outlook for developing the necessary infrastructure to deliver electricity to communities, businesses and industries of the NWT. Both plans converge through their shared objectives, but due to the Power System Plan's longer time horizon it adopts a visionary outlook to the adoption of technologies. For example, the Energy Plan focuses on the Storm Hills wind resource as the most likely to be developed in the three- to five-year time period, whereas the Power System Plan considers a regional wind development program for several communities along the Arctic Coast as possible development options in the six- to 20-year period.

The Power System Plan also considers expanded transmission grid development, with connection of NWT thermal communities being a key focus. New transmission infrastructure has the potential to transform our electricity system. The connection of the North and South Slave electricity grids, connections to Kakisa, Fort Providence, and other communities in the Dehcho, and future expansion of the Taltson and Snare hydro systems are all reflected in the Power System Plan.



Transmission line on the Snare Hydro system. Source: ITI/GNWT

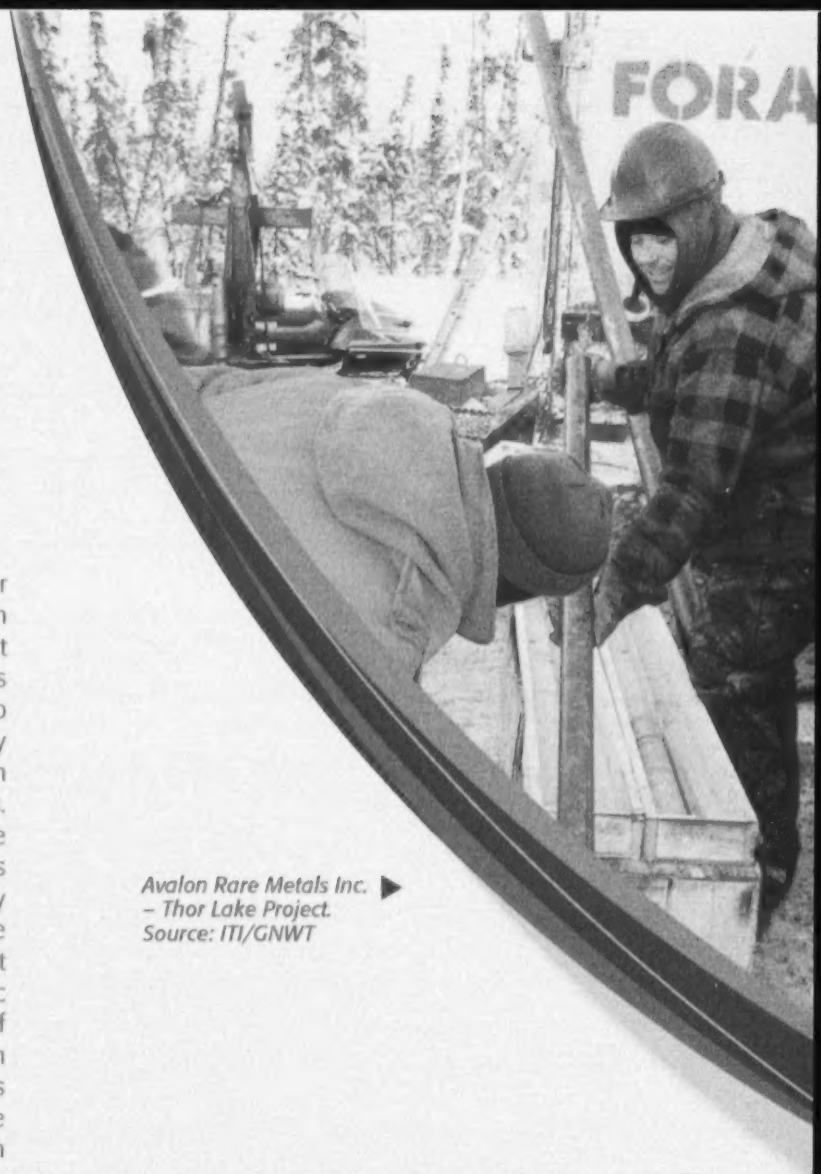
In addition to connecting communities, potential benefits of an expanded transmission and hydro system include:

- Providing a market for current surplus hydro generation would help NTPC increase its economies of scale and lower costs over the long-term.
- Improving the reliability of NTPC's supply to NWT residents would reduce outages and improve capital planning processes.
- Providing cleaner, lower cost grid power to the Slave Geological Province would positively impact existing mine life expectancy, as well as support investment in the development of new mine resources, benefiting the NWT economy. This potential benefit is reinforced in the recently released NWT Economic Opportunities Strategy and the Mineral Development Strategy.

6.2. LINKAGES TO MINERAL DEVELOPMENT STRATEGY AND ECONOMIC OPPORTUNITIES STRATEGY

This Energy Plan also considers two other strategic planning initiatives prepared for the 17th Legislative Assembly; the Mineral Development Strategy (MDS) and Economic Opportunities Strategy (EOS). The MDS and EOS are integral to the broader effort to build a sustainable economy by attracting investment that supports the creation of jobs and business opportunities in all sectors. In both the MDS and EOS, the need for affordable and secure sources of energy is recognized as vital to a prosperous NWT economy. This Energy Plan and the Power System Plan recognize the need to not only promote mineral development but also support the goal of broader economic development. For example, the emergence of LNG and the grid expansion vision outlined in the Power System Plan represent opportunities to supply mine sites and businesses with more cost effective electricity solutions. This Energy Plan takes steps towards making these resource options a permanent part of the energy supply mix.

The extractive sector is of critical importance to the NWT economy, providing important employment opportunities in addition to contributing 30% of the NWT's gross domestic product. The MDS recognizes that the limited availability of public infrastructure, including electrical power, is one of the principal deterrents to investment in exploration and the eventual development of deposits in the NWT.



Avalon Rare Metals Inc. – Thor Lake Project. Source: ITI/GNWT

The EOS is focused on identifying opportunities for economic diversity and realizing the economic potential that exists in our Territory. The Energy Plan supports businesses to make more efficient use of energy, as well as ensuring that they have access to the most cost effective and clean energy supply options available.

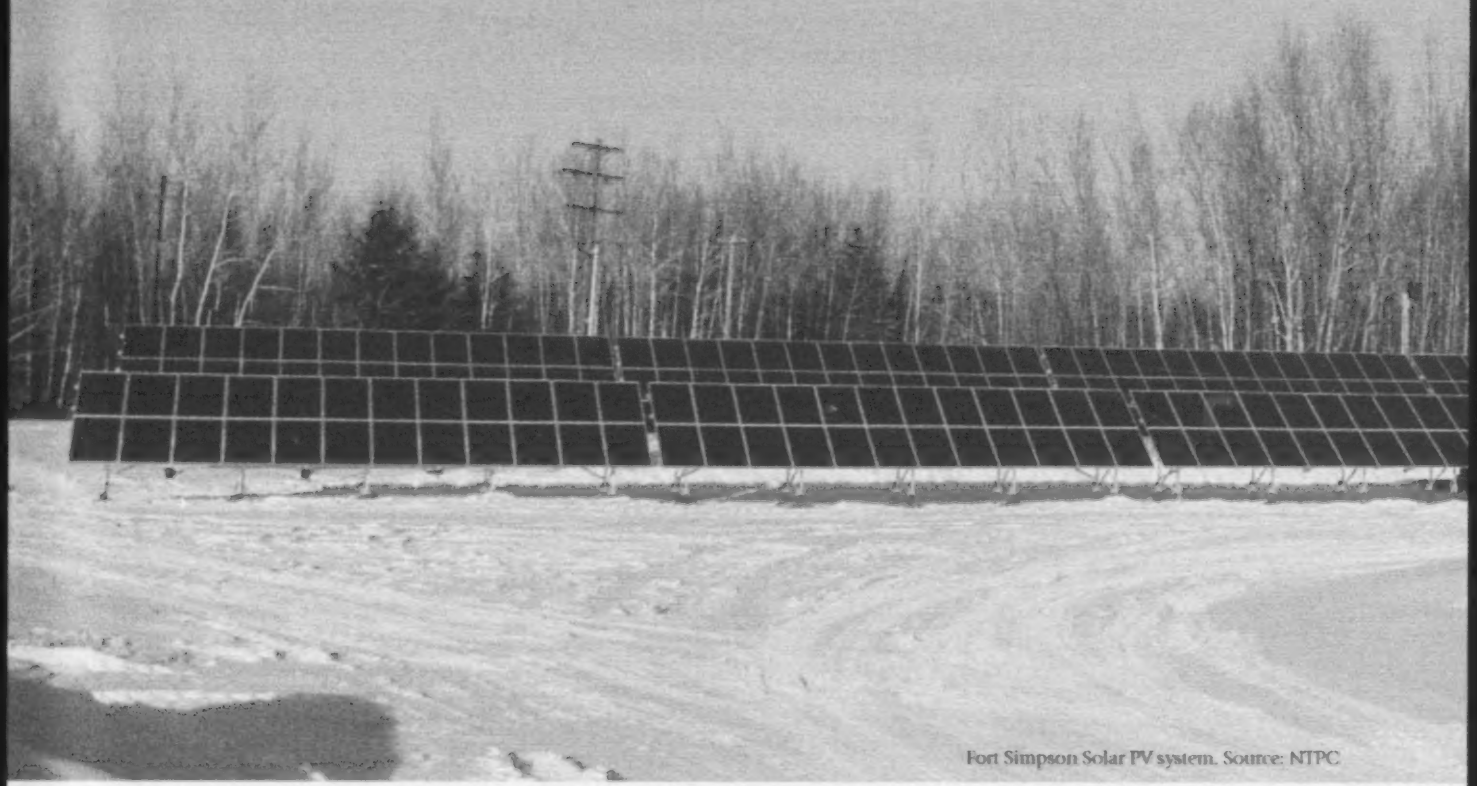
ACTION AREAS

ENERGY CONSERVATION AND EFFICIENCY

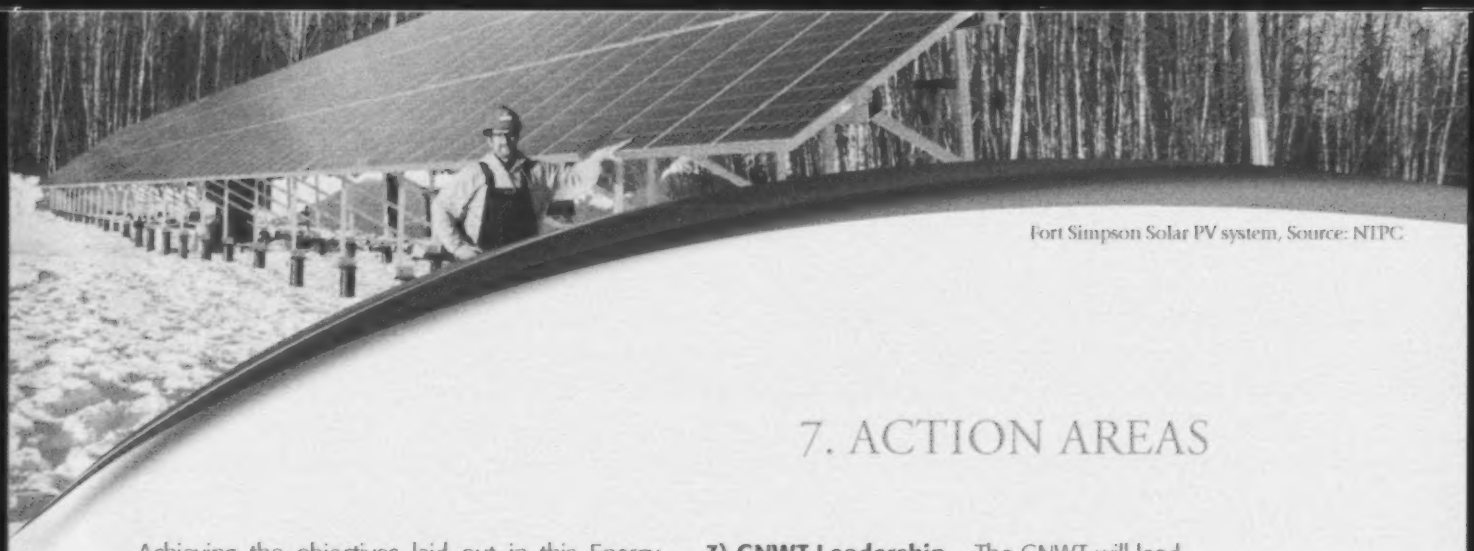
ENERGY SUPPLY

GNWT LEADERSHIP

POLICY AND PLANNING



Fort Simpson Solar PV system. Source: NTPC



Fort Simpson Solar PV system, Source: NTPC

7. ACTION AREAS

Achieving the objectives laid out in this Energy Plan will require the completion of a wide array of actions. The GNWT will need to ensure a balanced approach, taking into account all of its objectives – including those identified during the Charrette process – and the evolving needs of all 33 communities. GNWT efforts have been grouped in the following four action areas:

1) **Energy Conservation and Efficiency** – This action area outlines the GNWT's continuing efforts aimed at reducing overall energy use through conservation and efficiency measures. These are typically the most economic investments that can be made in terms of decreasing energy costs and mitigating the impacts of our energy use on the environment.

2) **Energy Supply** – This action area outlines the GNWT's efforts to manage the costs of energy while creating fundamental change to our Territory's energy supply scenario. Energy supply is further subdivided here into sub-categories, covering various sources of energy.

3) **GNWT Leadership** – The GNWT will lead by example, substantially reducing energy in Government facilities. As well, GNWT actions in areas such as biomass and LNG can expand alternative energy supply chains in the NWT by making new sources of supply more readily available for residents and businesses. The GNWT will also share best practices with communities, business and industry.

4) **Policy and Planning** – Long-term solutions require consistent, clear signals from Government. This includes legislation and regulation that can be used to influence behaviours, efforts to raise energy awareness, and planning and results reporting.

The Three-Year Action Plan reflects the budget for 2013-14 and planning targets for 2014-15 and 2015-16. This is similar to the approach taken towards broader GNWT business planning, which covers a three-year period. While establishing budgets for the 2014-16 timeframe is the responsibility of the Legislative Assembly, developing some planning targets reflects the longer-term approach to energy being proposed by the GNWT. This provides Members of the Legislative Assembly (MLAs) greater context as they consider annual budgets and provides a benchmark that they can use to gauge progress and to propose revisions to future budgets as required. The budget does not represent staff resources within the GNWT that work on energy planning, programs and projects. The Three-Year Action Plan is summarized on the following pages.

ACTIONS	2013-14 Budget	2014-15 Targets	2015-16 Targets
ENERGY SUPPLY			
HYDRO			
Whati Transmission Line	$250,000	$1,400,000	$1,400,000
Kakisa and Fort Providence Transmission Line	-	-	-
Water Monitoring / NWT River System Inventory	$50,000	$50,000	$50,000
Large-Scale Transmission Planning	$500,000	TBD	TBD
Great Bear River Mini-Hydro Initiative	-	$200,000	-
Hydro Sub-total	**$800,000**	**$1,650,000**	**$1,450,000**
BIOMASS			
Funding for Biomass Projects	$225,000	$275,000	$275,000
Biomass Promotion, Community Engagement and Project Evaluation	$175,000	$175,000	$175,000
Biomass Sub-total	**$400,000**	**$450,000**	**$450,000**
SOLAR			
Solar PV Electricity Generation	$250,000	$500,000	$500,000
Smart Grid Technology	$125,000	$125,000	$125,000
Solar Sub-total	**$375,000**	**$625,000**	**$625,000**
WIND			
Storm Hills Wind Project	$50,000	$50,000	-
Wind Monitoring	$50,000	$50,000	$50,000
Wind Sub-total	**$100,000**	**$100,000**	**$50,000**
NATURAL GAS			
Introduce LNG Supply in the Beaufort Delta	$100,000	-	-
LNG Conversion in the Thermal Zone	-	$150,000	$150,000
Natural Gas Sub-total	**$100,000**	**$150,000**	**$150,000**
INNOVATION			
Geothermal Feasibility	-	-	-
Alternative Energy Technology Program	$300,000	$300,000	$300,000
Electric Vehicle Demonstration Project	-	$15,000	$15,000
Innovation Sub-total	**$300,000**	**$315,000**	**$315,000**
Energy Supply Sub-total	**$2,075,000**	**$3,290,000**	**$3,040,000**

ACTIONS	2013-14 Budget	2014-15 Targets	2015-16 Targets
ENERGY CONSERVATION AND EFFICIENCY			
Funding the Arctic Energy Alliance	$1,260,500	$1,535,500	$1,535,500
Energy Efficiency Incentive Program (EEIP)	$400,000	$300,000	$300,000
Commercial Energy Conservation and Efficiency Program	$200,000	$200,000	$200,000
Energy Conservation Program	$200,000	$200,000	$200,000
Energuide Program	$150,000	$150,000	$150,000
Electric Hot Water Heater Replacement Program	$400,000	TBD	TBD
Identify Power Plant Residual Heat Projects	-	-	-
Energy Conservation and Efficiency Sub-total	**$2,610,500**	**$2,385,500**	**$2,385,500**
GNWT LEADERSHIP			
Capital Asset Retrofit Fund (CARF)	$1,200,000	$3,500,000	$3,000,000
Energy Efficiency Upgrades for Public Housing	$700,000	$700,000	$700,000
Biomass Heating Systems	$1,650,000	$1,400,000	$750,000
GNWT Leadership Sub-total	**$3,550,000**	**$5,600,000**	**$4,450,000**
POLICY AND PLANNING			
Issue Strategic Direction to NTPC	Includes an Accountability Framework, a commitment from the Electricity Review		
Reaffirm role of PUB	Clarify the role of the GNWT with respect to issuing policy direction to the Board in 2014.		
Develop Performance Indicators & expand energy data collection capacity	An ongoing exercise		
Establish a Net Metering Renewable Energy Policy	Policy in Development - Finalized in 2014		
Adjust Stand-by Rate Policy to Support Renewables	Policy in Development - Finalized in 2014		
Energy Efficiency Standards	Research costs and benefits, report published by October 2014		
Collaborative Policy Development	Commit to future collaborative policy development		
Promote Energy Literacy	Funded through existing resources to the AEA		
Research Innovative Financing Mechanisms	Evaluate cost/benefit of changes to the *Cities, Towns and Villages Act* to allow for municipalities to implement Local Improvement Charge for energy retrofits		
NT Energy Core Funding	$700,000	$700,000	$700,000
Policy and Planning Sub-total	**$700,000**	**$700,000**	**$700,000**
TOTAL	**$8,935,500**	**$11,975,500**	**$10,575,500**

The key areas of focus for this Energy Plan include:

- **Establishing a renewed focus on energy efficiency**
  In response to a large demand for increased energy efficiency services and programs, the GNWT has increased spending in this action area in recent years. In addition to funding for the Arctic Energy Alliance and incentive programs, $400,000 has been allocated to an electric hot water heater replacement project.

- **Transitioning three communities away from diesel-fired power generation**
  This Energy Plan outlines a path forward for building a hydroelectric transmission line to Whatì. It also commits the GNWT to constructing solar-diesel hybrid, battery power systems at two NTPC plants, including one in Colville Lake. These solar systems will reduce community reliance on diesel generation, and will allow NTPC to turn off the diesel generators completely at times during the summer months. .

- **Introducing liquefied natural gas into the NWT power mix**
  LNG deliveries will start at the Inuvik power plant during the autumn of 2013. By mid-2014, it is hoped that as much as 75% of Inuvik's power needs will be met by LNG. Work will also commence on introducing LNG to the Dehcho region, first in Fort Simpson and then in other road-connected communities. The potential for LNG to replace diminishing natural gas in Inuvik, for heating purposes, will also be examined.

- **Further expand the use of biomass throughout the NWT**
  The GNWT will install wood pellet boilers at the Mackenzie Mountain School, the Airport Terminal Building and Combined Services Building in Norman Wells, thus extending the supply chain for biomass further north into the NWT.

- **Developing policies that enable an increase in the use of renewable energy and energy efficiency technologies**
  The GNWT will issue strategic direction to NTPC, reaffirm role and priorities of the PUB, implement a net-metering program, and establish performance indicators to inform the energy planning process.

7.2. ENERGY CONSERVATION AND EFFICIENCY

Energy conservation and efficiency investments are often the most economic decisions that governments, residents and businesses can make. Conserving energy, and increasing the efficiency of our energy usage, supports the objectives of affordability, reliability and environmental protection. Such investments also bring new technologies and knowledge to our Territory, improving our economy and helping us to increase competitiveness.

With electricity rates in NWT thermal communities hovering near 50 cents per kWh, and with the growing cost of oil, northerners are especially motivated to reduce their energy use. The GNWT continues to fund incentive programs that aid consumers in making the switch to energy conserving technologies. The GNWT will also invest in demonstration projects for communities, such as the Hot Water Heater Replacement Program.

ACTIONS	2013-14 Budget	2014-15 Targets	2015-16 Targets
ENERGY CONSERVATION AND EFFICIENCY			
Funding the Arctic Energy Alliance	$1,260,500	$1,535,500	$1,535,500
Energy Efficiency Incentive Program	$400,000	$300,000	$300,000
Commercial Energy Conservation and Efficiency Program	$200,000	$200,000	$200,000
Energy Conservation Program	$200,000	$200,000	$200,000
Energuide Program	$150,000	$150,000	$150,000
Electric Hot Water Heater Replacement Program	$400,000	TBD	TBD
Identify Power Plan Residual Heat Projects	-	-	-
Sub-total	**$2,610,500**	**$2,385,500**	**$2,385,500**

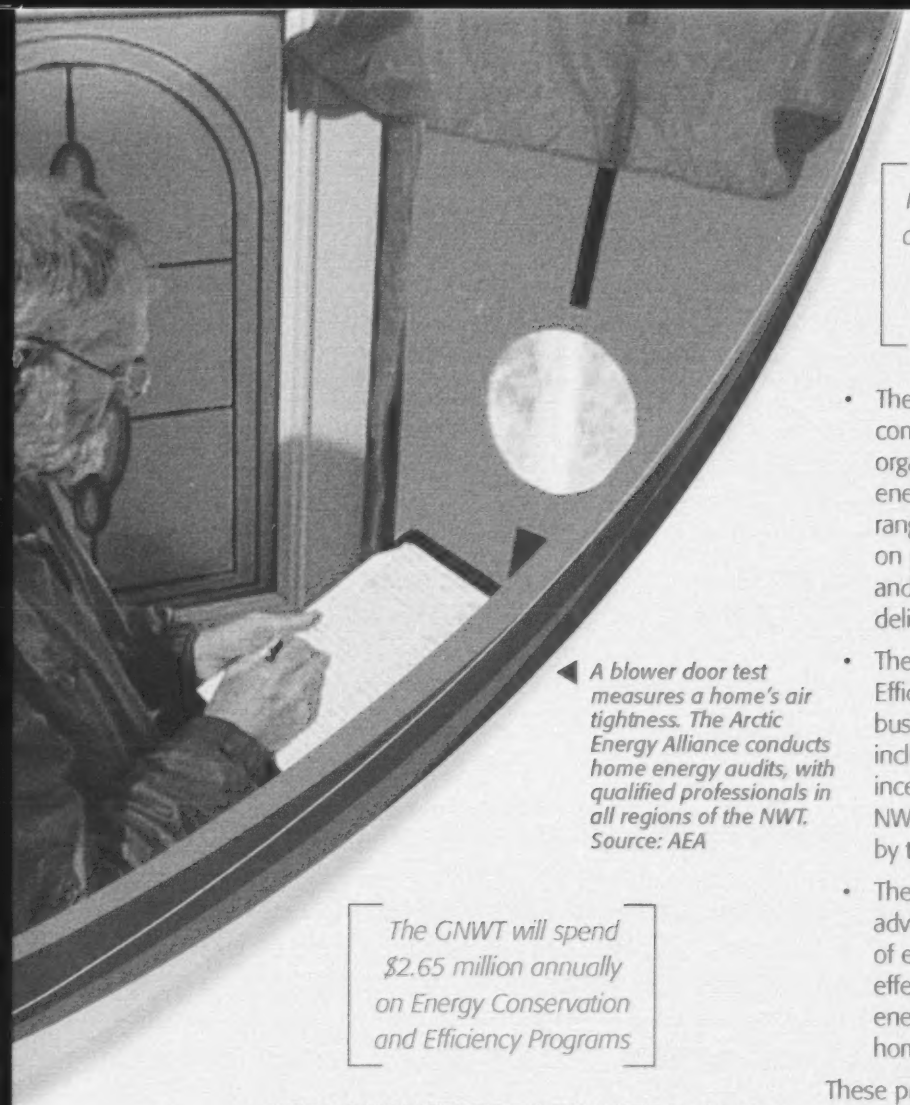
7.2.1. FUNDING THE ARCTIC ENERGY ALLIANCE

The Arctic Energy Alliance (AEA) is the lead government agency helping communities, consumers, producers, regulators and policymakers to work together to reduce the cost and environmental impacts of energy usage in the NWT. Recognizing the importance these activities play in achieving the government's objectives, the AEA has expanded its regional offices to Fort Simpson, Inuvik, Norman Wells and Whati. Additionally, in the life of this Energy Plan, an ongoing position in the South Slave will be established. These Regional Energy Advisors support local energy efficiency and conservation measures and renewable energy projects. They deliver AEA programs and services in the regions where they are located and facilitate visits by Yellowknife-based AEA energy specialists on an as needed basis for specific projects, including home energy evaluations. This approach has allowed the AEA to work more closely with communities in every region of the NWT.

Total number of home energy evaluations completed by AEA since 2003: 2,158

ACTION

Continue to fund the Arctic Energy Alliance to ensure effective delivery of energy programs, services and information in all NWT communities. Expand AEA's presence to include an office in the South Slave.



A blower door test measures a home's air tightness. The Arctic Energy Alliance conducts home energy audits, with qualified professionals in all regions of the NWT. Source: AEA

The GNWT will spend $2.65 million annually on Energy Conservation and Efficiency Programs

7.2.2. ENERGY CONSERVATION AND EFFICIENCY PROGRAMS

The GNWT has developed a comprehensive suite of energy programs to support residents, businesses and communities in reducing their energy costs and GHG emissions. These programs are delivered through the AEA and the Department of Environment and Natural Resources (ENR) and include the following:

- The Energy Efficiency Incentive Program (EEIP) provides rebates to residents, businesses and non-profit organizations who install more energy efficient equipment in their home or facility. The program also provides rebates for converting to biomass through the purchase of wood pellet stoves and wood stoves. The program covers a variety of items ranging from kitchen and heating appliances to insulation, windows and hot water systems. The program is delivered by the AEA.

Residents who install a wood pellet or cord wood stove are eligible to receive up to $1,000 through the Energy Efficiency Incentive Program

- The Energy Conservation Program supports communities, agencies, and not-for-profit organizations interested in reducing their energy use. The program has a broad range of approved applications but focuses on projects that support cost savings and emission reductions. The program is delivered by ENR.
- The Commercial Energy Conservation and Efficiency Program is designed to support businesses to reduce their energy use. It includes auditing services and financial incentives for energy efficiency retrofits for NWT businesses. This program is delivered by the AEA.
- The EnerGuide Program funds energy advisors through the AEA to offset the cost of energy audits and identify the most cost-effective opportunities for residents to make energy efficiency improvements in their homes.

These programs have been successful in reducing GHG emissions and increasing energy affordability for rebate and grant recipients. There will always be a key role for incentive programs as they not only influence behaviour but play a substantial role in raising awareness. Current programs are continually revised to respond to market changes or opportunities that emerge.

Two recent changes to energy efficiency programing include:

- *A financial incentive is now available for the purchase of new ENERGY STAR chest freezers.*
- *A financial incentive is now available for new homes that obtain an EnerGuide rating of 81 or higher, with the incentive being greater for a higher EnerGuide rating.*

During 2013-14, a program review will be conducted to assess the effectiveness of all of the energy conservation and efficiency programs and ensure they are structured to achieve broad-based results. For example, programs focused on incentives usually target those who are in a position to make new investments in appliances or retrofits for their home. Are there opportunities to target other segments of the population who may not be in a position to make energy efficiency investments?

ACTION

Continue to provide substantial funding for energy conservation and efficiency incentive programs. Undertake a comprehensive program review in 2013-14 to ensure funding is effective and impacting a broad base of NWT residents, businesses and community governments.

7.2.3. ELECTRIC HOT WATER HEATER REPLACEMENT PROGRAM

Replacing an electric hot water heater with an oil-fired equivalent in a community with diesel electricity generators will result in an estimated annual reduction of two tonnes of GHG emissions.

A family of four with an electric hot water heater can use up to 450kWh of electricity per month just to heat water.[2] In communities with higher priced, diesel-fired power generation, replacing electric hot water heaters with oil fired ones can have a payback period of as little as two years. This pilot project is expected to result in significant savings for homeowners on power bills, as well as reduced spending by the GNWT on power rate subsidization. In the 2013-14 fiscal year, ENR is working with the AEA to replace electric hot water heaters in a number of targeted non-hydro communities. At least 55 electric hot water heaters will be replaced.

ACTION

Implement an Electric Hot Water Heater Replacement Program in four thermal communities. The GNWT will consider extending this project to other communities in 2014-15 and beyond based on results.

7.2.4. POWER PLANT RESIDUAL HEAT PROJECTS

Diesel-fired power generation for remote communities is the most economic and reliable form of power generation, but it produces GHG emissions and is not very efficient. About two-thirds of the energy contained in the diesel fuel is lost as heat in the power generation process. Installing residual heating systems allows this heat to be captured and used to heat buildings in the vicinity of the diesel plant, thus increasing the efficiency of the plant.

NTPC already meets its own heating needs at the majority of its diesel facilities through waste heat, and has installed systems for access by other customers in Fort McPherson, Fort Simpson, Fort Liard and Whati. All of these projects required capital subsidies, but were identified as locations requiring the least amount of subsidy. The Inuvik power plant is recognized as the most viable locations for a future residual heat project, however transitioning to LNG is the facility's current focus.

ACTION

Continue to monitor NTPC's power generation facilities for future investment opportunities in residual heat projects.

2. This figure has been provided by the Arctic Energy Alliance.

7.2.5. TRANSPORTATION

The transportation sector accounts for 34% of all energy consumed in the NWT. Commercial vehicles produce 19% of all GHG emissions. This can be attributed to a small population residing in 33 communities across a vast area, distant southern markets and an under-developed transportation system. These challenges can be illustrated by the transportation needs of isolated communities and industrial operations. The Arctic community of Sachs Harbour has one resupply barge a year delivering fuel and bulk cargo with all remaining transportation activities reliant solely on air service. Diavik Diamond Mine consumes 45 million litres of fuel annually, all of which is trucked to the mine site from the south.

Compounding the constraints of geography and the lack of infrastructure, technology currently only offers incremental improvements. As a result, the GNWT is focusing its effort on strategic infrastructure investments that will make transportation more efficient. *Corridors for Canada III: Building for Prosperity* proposes an investment of $600 million over ten years in transportation under the federal government's new infrastructure funding plan, called the New Building Canada Fund. The GNWT is also taking steps to improve its own operation efficiencies and ensure legislation and policies are supporting the efficient transport of goods.

Investment in transportation infrastructure has a direct impact on the Territory's energy profile. The opening of the Deh Cho Bridge has eliminated the annual consumption of 400,000 litres of diesel by the Merv Hardie plus that used for the construction of the ice bridge and the idling of 70,000 vehicles at the ferry crossing. The construction of the Inuvik to Tuktoyaktuk Highway will reduce the road distance between the two communities by 60 kilometres and decrease air travel. The development of a Mackenzie Valley Highway remains a long-term goal of the GNWT that will vastly improve the efficiency of the transportation sector in the NWT. Also, the Power System Plan's proposed connection of mines to the hydro grid in the North Slave region would displace the need to transport 100 million litres of fuel annually, a process that requires over 2,000 truck loads.

Investments in transportation can promote opportunities in the broader energy sector. To support the use of LNG in Mackenzie Delta communities, the Department of Transportation (DOT) has invested over $1 million in extending the ferry service along the Dempster highway. This will allow for the uninterrupted resupply of LNG, propane, and other commodities during freeze-up, lowering the cost of living in the region.

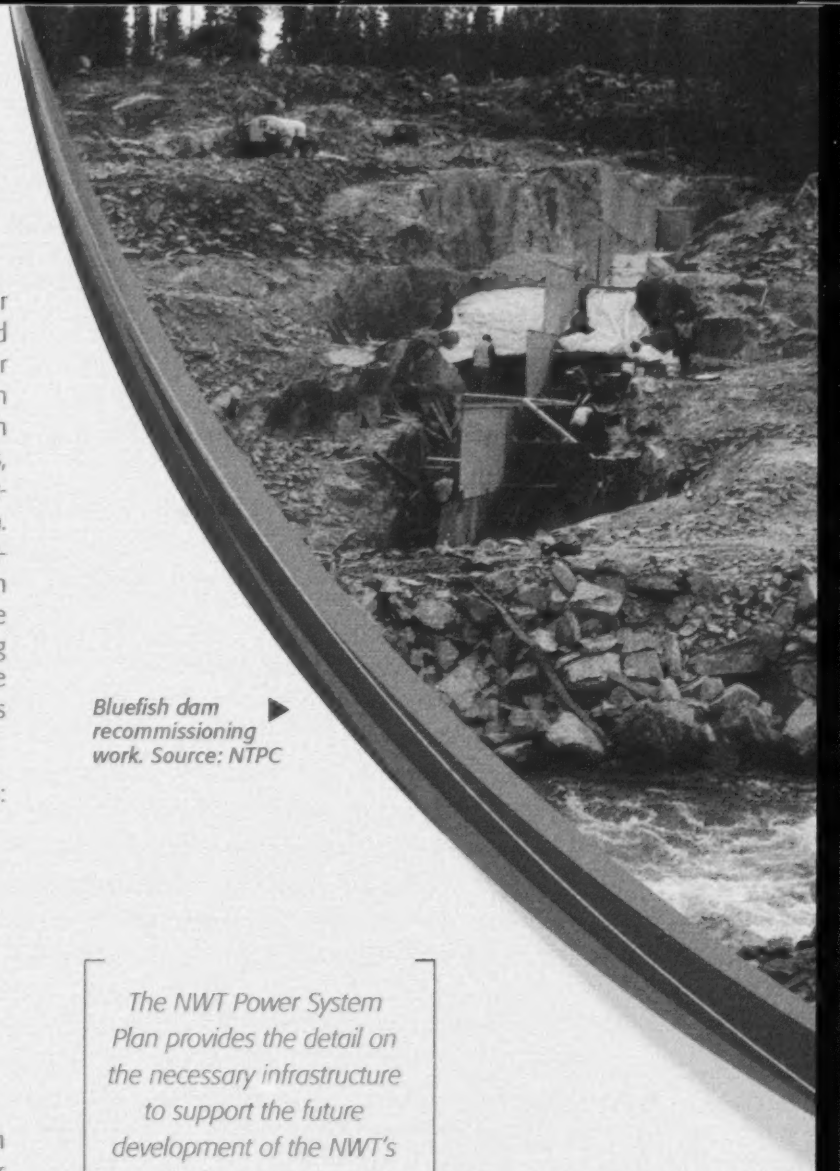
In the long-term, the use of LNG for trucking could have a substantial impact on the NWT's transportation sector. Transportation corridors are being actively developed throughout North America, which would enable trucks to run on LNG. The effort to link Fort McMurray to Vancouver is in close proximity to the NWT; in time, perhaps a corridor could be expanded to the Territories.

In 2011, the Department released *Green Light*, an environmental strategy which highlights DOT's existing environmental practices and the goal of fostering a corporate culture of environmental excellence. An outcome of the strategy is to develop a DOT Greenhouse Gas Reduction Plan, due for release in 2014. The plan will aim to reducing DOT's energy consumption, working with the private sector to realize efficiencies within the transport industry, engaging with the federal government on regulatory changes and promoting smart driving and active transportation.

As a result of the geographic constraints of the NWT, transportation will continue to represent a large percentage of the energy profile. However, by improving access to communities with strategic investments in infrastructure and promoting conservation and active transportation, the GNWT can make significant incremental improvements to the transportation sector.

7.3. HYDRO

With tremendous hydro potential of over 11,000MW in the NWT, many residents and communities have advocated for further development of this resource. Investments in increasing our hydroelectric capacity, through generation and transmission development projects, help us to meet the objectives of reliability, long-term affordability, and environmental protection. Project development work also creates short-term and long-term jobs, and can help strengthen communities by giving them access to a more stable, sustainable supply of energy. Keeping energy dollars within the Territory helps us increase economic opportunities, and better manage costs in the long-term.



Bluefish dam recommissioning work. Source: NTPC

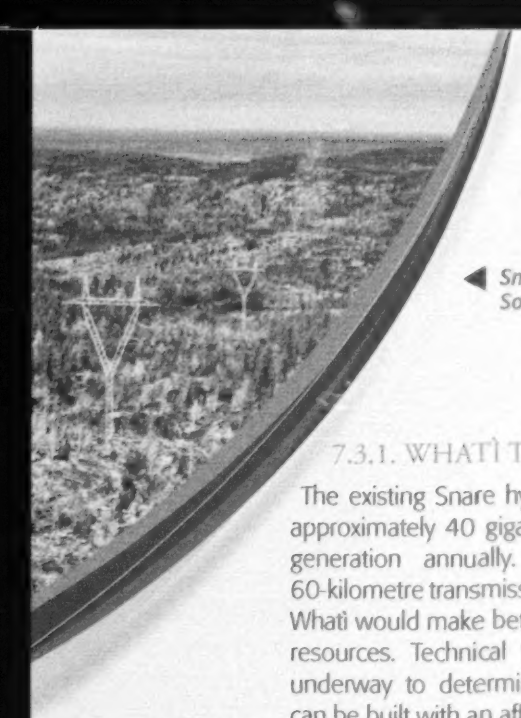
GNWT work to date has led to two key conclusions:

- In order to meaningfully reduce the cost of power in the NWT, extensive electricity transmission infrastructure is required, including a potential link with the continental grid; and
- With rising diesel costs, some small-scale transmission lines are close to being economic and can be managed within the fiscal capacity of the GNWT.

A fundamental change in the 'energy equation' in the NWT is required, based on greater use of our hydro resources and displacing imported oil. That can be accomplished with the following short and long-term actions:

The NWT Power System Plan provides the detail on the necessary infrastructure to support the future development of the NWT's hydro resources.

ACTIONS	2013-14 Budget	2014-15 Targets	2015-16 Targets
ENERGY SUPPLY			
HYDRO			
Whati Transmission Line	$250,000	$1,400,000	$1,400,000
Kakisa and Fort Providence Transmission Line	-	-	-
Water Monitoring / NWT River System Inventory	$50,000	$50,000	$50,000
Large-Scale Transmission Planning and the Power System Plan	$500,000	TBD	TBD
Great Bear River Mini-Hydro Initiative	-	$200,000	-
Hydro Sub-total	**$800,000**	**$1,650,000**	**$1,450,000**



Snare Transmission Line
Source: ITI/GNWT

7.3.1. WHATÌ TRANSMISSION LINE

The existing Snare hydro system currently 'spills' approximately 40 gigawatt hours of excess hydro generation annually. The development of a 60-kilometre transmission line to the community of Whatì would make better use of our existing hydro resources. Technical feasibility work is currently underway to determine if this transmission line can be built with an affordable level of government subsidization.

This transmission line would cross Tłı̨chǫ lands and therefore would require the support of the Tłı̨chǫ Government. If the Tłı̨chǫ Government agrees, and current work proves the transmission is feasible, the GNWT is prepared to provide up to a $3-million subsidy to begin development work. This project could represent a fundamental change and transformation of a 'diesel community' to a renewable energy community. In addition, the proposed transmission line will be built in proximity to a potential 13MW hydroelectric site available on the La Martre River. If developed, this line will become a vital piece of infrastructure for the North Slave region.

ACTION

Begin discussions with the Tłı̨chǫ Government concerning the construction of a transmission line to Whatì, and if the project can go forward, provide up to a $3-million subsidy to make the line financially viable.

7.3.2. KAKISA AND FORT PROVIDENCE TRANSMISSION LINE

With the opening of the Deh Cho Bridge, and the launch of the Power System Plan, the GNWT has new options for extending a hydropower transmission line to Kakisa and Fort Providence.

One scenario includes running a low voltage line from the Taltson hydroelectric facility directly to Kakisa and Fort Providence. The economics of this project are more challenging than for the Whatì project. The Fort Providence project would cost in the range of $24 to $30 million and require a subsidy of between $7 and $15 million, depending upon the route. Work will continue to examine ways to further refine this analysis with a view to reducing the required subsidy. Options for federal support for this project will also be examined.

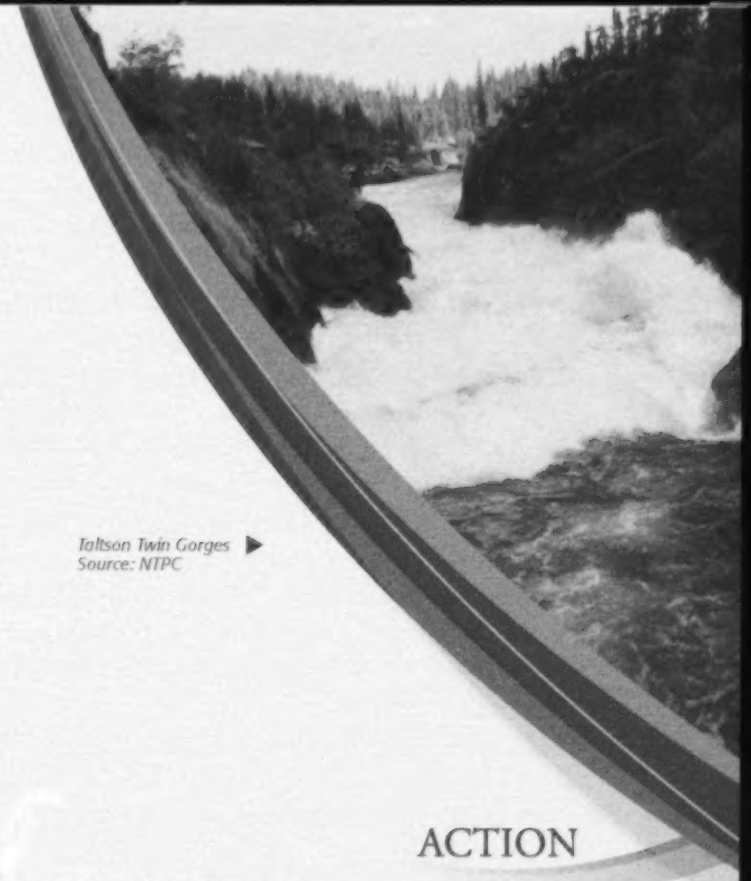
A second scenario depends on the progression of the Power System Plan. There may be potential to run a high voltage transmission line around the western side of Great Slave Lake, connecting the NWT's two power systems. A low voltage 'step-down line' would be put in place to serve the communities of Fort Providence and Kakisa. This step-down line would cost in the range of $20 million.

ACTION

Continue to assess options to extend hydro power to Kakisa and Fort Providence working with existing resources.

7.3.3. WATER MONITORING / NWT RIVER SYSTEM INVENTORY

In order to better understand the NWT's hydro potential, NT Energy has conducted regional hydro assessments in the Sahtu, Gwichin and Inuvialuit regions. These assessments have identified hydro sites that may be suitable for further study. NT Energy will continue its hydro assessment program in 2013-14 and with the help of the local community has identified potential sites on the Kakisa River. There is power potential in the range of up to 8.5MW near the community, which could serve a future expanded power grid in the South Slave region. A recent community visit to Kakisa suggests that community residents are interested in understanding what low-impact opportunities exist for hydro development that could benefit their community and displace diesel-fired electricity.



Taltson Twin Gorges ▶
Source: NTPC

ACTION

Provide $50,000 per year for three years to monitor water flows. Continue to assess the potential for a mini-hydro project.

7.3.4. LARGE-SCALE TRANSMISSION PLANNING

As discussed earlier, the Power System Plan provides a vision for the development of a large-scale hydroelectric transmission and generation network in the NWT. This initiative presents the best opportunity for fundamental change in energy supply for communities and industry over the long-term. Expanding the use of hydroelectricity will help stabilize and ultimately reduce the cost of electricity for the residents and businesses of the NWT. This project development work will need to include industry and the federal government.

The GNWT is currently supporting additional technical feasibility work currently underway. Once this work is completed, there will be further discussions with Aboriginal governments, communities, industry and the federal government on ways to work together to transform NWT energy systems over the long term.

ACTION

Invest $500,000 in 2013-14 to investigate opportunities for large-scale transmission and further the development of NWT hydro resources, to be reflected in a Northwest Territories Power System Plan.

7.3.5 GREAT BEAR RIVER MINI-HYDRO PROJECT

Preliminary feasibility work on a run of river mini-hydro project near Deline indicates that there is the potential to provide hydroelectricity to the community. This development is proposed as a very low head hydro facility that would not impede boat travel. The focus of the next phase of work is to perform advanced design, undertake additional ice analysis and to develop a more detailed business case for the project. The business case will include examining the viability of a larger, or subsequently expanded, facility that might link the communities of Tulita and perhaps Norman Wells. This work could provide the basis for a longer term strategy for hydro development in the Sahtu region.

ACTION

The GNWT will invest $200,000 in 2014-15 to support the development of a detailed technical and economic evaluation of the hydro potential of the Great Bear River.

7.4. BIOMASS

Firewood was once the primary energy resource used in the NWT. Today, wood pellets are gaining in popularity and for good reason. Increasing the availability and use of biomass helps us to meet the objectives of reliability, long-term affordability, and environmental protection. Also, there is a strong potential to produce biomass fuel sources locally – keeping our energy dollars within the Territory – and the GNWT will continue to support these efforts. Currently, the supply of biomass is most firmly established in the North and South Slave regions of the NWT.

The GNWT is dedicated to expanding the use of biomass in the NWT and as a result has committed a total of $8.80 million to strategic biomass investments over the next three years. This money includes $1.40 million invested by the Federal government in 2013-14 and $0.90 million by the GNWT to maintain sustainable forest resources and encourage the commercial development in the forest sector. Continued work in this area is critical to maintaining a balanced approach to managing our forest resources (FR).

The *Northwest Territories Biomass Energy Strategy* (see: www.nwtenergy.ca) details the GNWT approach to expanding the use of biomass. Part of this effort will be to expand the biomass supply chain throughout the Mackenzie Valley. This effort is supported by $5.20 million to be invested in the installation of wood pellet boilers in GNWT facilities; these projects will drive demand and support investment in the wood pellet supply chain. For an overview of the proposed projects read section 7.8 "GNWT Leadership". In addition, close to $1.30 million is allocated to programs designed to incentivize, educate, train and evaluate biomass projects.

This GNWT will spend $8.8 million on supporting biomass development in the NWT.

ACTIONS	2013-14 Budget	2014-15 Targets	2015-16 Targets
ENERGY SUPPLY			
BIOMASS			
Funding for Biomass Projects (AETP)	$225,000	$275,000	$275,000
Biomass Promotion, Community Engagement and Project Evaluation	$175,000	$175,000	$175,000
Biomass Sub-total	**$400,000**	**$450,000**	**$450,000**

7.4.1. FUNDING FOR BIOMASS PROJECTS

Although biomass heating systems have proven to be a good financial investment, the upfront cost can be more than a conventional heating unit.

> *Residents can secure up to $5,000 to support their investment in the installation of a wood pellet boiler.*

To address this barrier, funding is available to support the cost of planning, purchasing and installing these technologies. Communities, business and individuals may apply for support through the Alternative Energy Technology Program (AETP). Additionally, residents can secure funding to install pellet stoves and woodstoves through the Energy Efficiency Incentive Program (EEIP). See Section 7.2.2., Energy Conservation and Efficiency Programs, for details on the EEIP.

ACTION

Continue to support both the Alternative Energy Technology Program with $250,000 in 2013-14, and $275,000 in fiscal years 2014-15 and 2015-16.

7.4.2. BIOMASS PRODUCTION, COMMUNITY ENGAGEMENT AND PROJECT EVALUATION

The Biomass Strategy encourages the increased use of wood burning appliances. In order to achieve this objective it is important that installers are trained properly and consumers are educated on efficient and safe burning techniques. The AEA will offer the 'Wood Energy Technology Transfer' (WETT) Certification in NWT communities, training local technicians how to install and safely operate wood burning appliances.

As well, the AEA will offer 'Burn it Smart' training workshops in communities for residents interested in learning about efficient and safe cordwood-burning techniques. In addition to promoting the safe use of biomass, AEA also produces and disseminates promotional materials to encourage the switch to biomass; these materials have included the *Residential Wood Pellet Heating* guide and a web video series on successful biomass district heating systems developed in **Behchokǫ̀** and Yellowknife.

Communities have shown an increased interest in the use of biomass to heat buildings, including the application of district energy systems. Getting the qualified expertise to guide investment decisions in the early stages is challenging in many communities. AEA has the capacity to conduct preliminary feasibility studies that help scope community investments in projects that are going to best meet their needs with the highest potential for success.

ACTION

Continue targeted biomass programming through the AEA, with $500,000 spread out over the next three years (2013-2016).

7.4.3. FOREST RESOURCE AND INDUSTRY DEVELOPMENT ACTIVITIES

The Biomass Strategy recognizes the tremendous potential of NWT's forests to support the development of a biomass industry; creating jobs, keeping money in the local economy and potentially lowering energy costs. The GNWT is committed to the development of the industry while ensuring that harvests remain sustainable. To achieve this, a coordinated effort is required to bridge the inter-connections between forest inventories and planning, community engagement and industry development. ENR has committed to spend $900,000 over the next three years to support these initiatives. The Federal Government has invested $1.40 million in 2013-14 supporting this work with ongoing discussions to expand on their investment.

Sustainable forest management requires detailed inventories, which then allow for the development of harvest planning sequencing. The GNWT is working with communities and Aboriginal governments to undertake research on the sustainability of forest harvesting levels, track forest harvesting, and provide key sustainability indicators related to the forest ecosystem and wildlife habitat. This work will lead to the development of forest management agreements with First Nations and the establishment of wood marshaling yards for interested communities. The establishment of a forest industry that will bring economic benefits is built on this work, and must ensure that forests remain healthy and productive.

ACTION

The Federal Government has made a $1.4 million investment in this area in 2013-14; the GNWT will continue to discuss ongoing funding with Federal partners.

7.5. SOLAR ENERGY

Solar energy is a renewable resource, and the long hours of sunlight in spring and summer in the NWT can provide usable heat and electricity for up to eight months of the year. The annual solar resource in Fort Simpson for example, is greater than Berlin and Tokyo, and comparable to most of Ontario – all locations where large investments in solar technology have taken place. Solar energy helps us to meet the objectives of environmental protection by displacing diesel generation, and is a step towards improving reliability and security of supply through the use of a local source of energy.

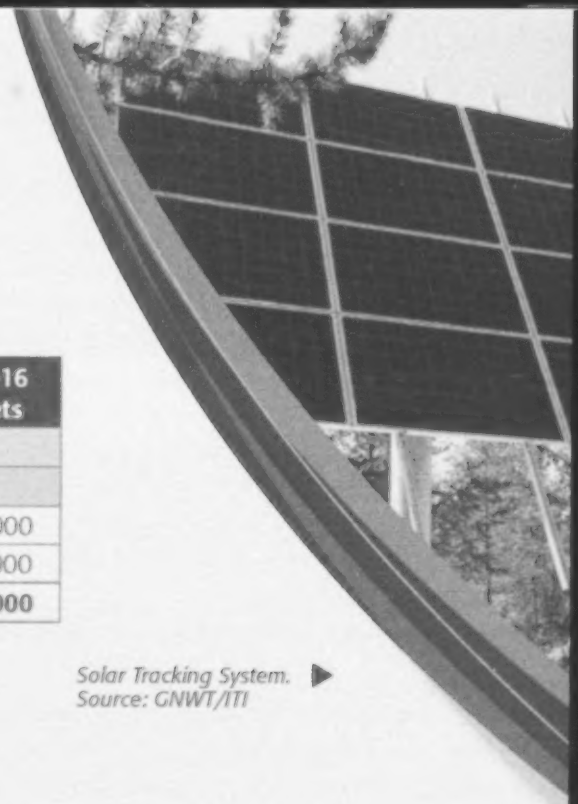
The GNWT released the *Solar Energy Strategy* in November 2012 during the *NWT Energy Charrette* (see www.nwtenergy.ca). The strategy provides the context for solar energy in the NWT and outlines a number of actions:

- Continued support for the installation of solar energy systems by residents and businesses. There are well over 200 solar installations in the NWT;
- Continued public outreach as well as coordination of efforts across government;
- Development of 'standard' grid-connected solar photovoltaic (PV) systems; and

The *Solar Energy Strategy* also sets a long-term target of installing solar systems with the capability to supply up to 20% of the average load in NWT diesel communities. This is an ambitious target, but the investments outlined below will allow the GNWT to make substantial progress in this growing field of energy production. The Power System Plan further defines communities with solar potential to be developed over the next 20 years.

Residents can secure up to $5,000 through the Alternative Energy Technology Program to support their investment in a solar photovoltaic system.

ACTIONS	2013-14 Budget	2014-15 Targets	2015-16 Targets
ENERGY SUPPLY			
SOLAR			
Solar PV Electricity Generation	$250,000	$500,000	$500,000
Smart Grid Technology	$125,000	$125,000	$125,000
Solar Sub-total	**$375,000**	**$625,000**	**$625,000**



Solar Tracking System. ▶
Source: GNWT/ITI

7.5.1. SOLAR PV ELECTRICITY GENERATION

A 104kW photovoltaic system installed in Fort Simpson is saving rate payers $31,000 and reduces GHG emissions by 72 tonnes annually.

The GNWT will continue to invest in community and utility-scale solar systems in diesel communities. In order to optimize the use of the PV systems, smart micro-grid technology will be developed in conjunction with the PV array installation.

In 2013-14, feasibility work will start on developing a solar array with a battery system, combined with smart grid technology, in Colville Lake. The battery system is being designed to allow the diesel engines in the community to be shut down for extended periods of the day during the summer months, and also to help reduce short-term power outages. Many community members at the Charrette lamented the constant noise and emissions coming from their local diesel plants.

The installation in Colville Lake will be followed by an installation in either Jean Marie River or Nahanni Butte in 2015-16. These three relatively small communities were chosen as they have the least efficient systems while also having some of the highest fuel costs in the NWT, and therefore, the greatest opportunity to continue to improve upon the economics of solar installations. Feasibility work continues on this effort.

ACTION

Funding of $250,000 in 2013-14 and $500,000 in the following two years is dedicated to the installation of a solar array with energy storage in Colville Lake. Another project will proceed in either Nahanni Butte or Jean Marie River in 2015-16.

7.5.2. SMART GRID TECHNOLOGY

A 'smart grid' is an electrical system that uses communications technology to gather and act on information, such as behaviours of suppliers and consumers, in an automated fashion to improve the efficiency, reliability, economics, and sustainability of the production and distribution of electricity.

A combination of diesel dispatch options, demand side management and smart meter technologies can reduce diesel consumption in communities. Generating power from diesel in remote communities is not ideal, but by monitoring load profiles using smart meters, it is possible to improve system performance and efficiency by developing efficient diesel dispatch and load control strategies. This reduces GHG emissions and saves customers, as well as the GNWT, money.

Two remote diesel communities in British Columbia have realised diesel savings between 15% and 20% simply by reconfiguring diesel dispatch set points and using demand side management and demand response strategies. They were then able to optimally select and size renewables (solar and mini-hydro) which provided further diesel offsets.

In 2013-14 smart meters will be installed in two communities; one with the assistance of a federal funding agency and one through the GNWT, beginning with the communities identified above for solar PV installations. Between 2014 and 2016 smart meters will be installed in an additional two communities.

ACTION

Install smart meters and carry out smart-grid research in four communities over three years through funding of $125,000 per year. This work will facilitate the installation of renewable energy systems in these communities.

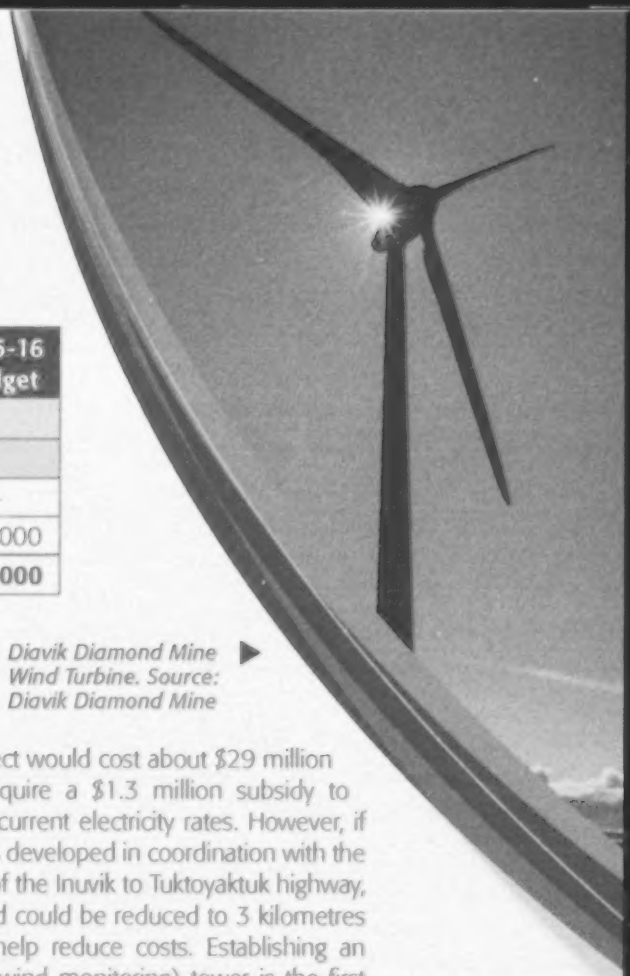
7.6. WIND ENERGY

Wind energy provides an intermittent renewable power resource that is increasingly being deployed in remote northern locations. The use of such wind energy technologies can help us to meet the objectives of long-term affordability and environmental protection.

Research and development on integrating wind turbines with diesel generators, known as 'Wind-Diesel Hybrid Systems', began in Alaska in 1990 in an attempt to offset imported fuel. NTPC started a wind energy program in 1996, but immature technology, insufficient local capacity to maintain the systems and several other factors resulted in failed projects. The construction of the 9.2MW wind farm at the Diavik Mine in 2012 brought utility-scale wind energy development to Canada's north.

After extensive wind monitoring work, site investigations and stakeholder engagement efforts along the NWT's Arctic coast – where the wind regime is strongest – the GNWT has narrowed its focus on the Storm Hills project outside of Inuvik. Inuvik has a load profile and power plant large enough to accommodate this intermittent source of power. The Power System Plan illustrates that the development of the wind resource in Arctic coast communities remains a future consideration.

ACTIONS	2013-14 Budget	2014-15 Budget	2015-16 Budget
ENERGY SUPPLY			
WIND			
Storm Hills Wind Project	$50,000	$50,000	-
Wind Monitoring	$50,000	$50,000	$50,000
Wind Sub-total	**$100,000**	**$100,000**	**$50,000**



Diavik Diamond Mine Wind Turbine. Source: Diavik Diamond Mine

7.6.1. STORM HILLS WIND PROJECT

Data from Environment Canada's Storm Hills weather station indicates an average annual wind speed of 6.7 metres/second. At 75 metres in height, the average speed could be 8 metres/second. This is considered a world class resource. A pre-feasibility study of a turbine with a capacity of 1.8MW indicates that it could meet 18.5% of Inuvik's annual electricity demand.

The primary challenge is that the project is located 60 kilometres from the nearest power connection in Inuvik and would require a 17-kilometre access road. The project would cost about $29 million dollars and require a $1.3 million subsidy to compete with current electricity rates. However, if the project was developed in coordination with the development of the Inuvik to Tuktoyaktuk highway, the access road could be reduced to 3 kilometres which would help reduce costs. Establishing an anemometer (wind monitoring) tower is the first step, followed by detailed feasibility analysis. In total, this project will require three to six years for development, aligning it with the planned completion of the Inuvik to Tuktoyaktuk highway.

ACTION

Install a wind monitoring tower at the Storm Hills site and complete a feasibility analysis of wind power development. $50,000 in funding is dedicated for both 2013-14 and 2014-15.

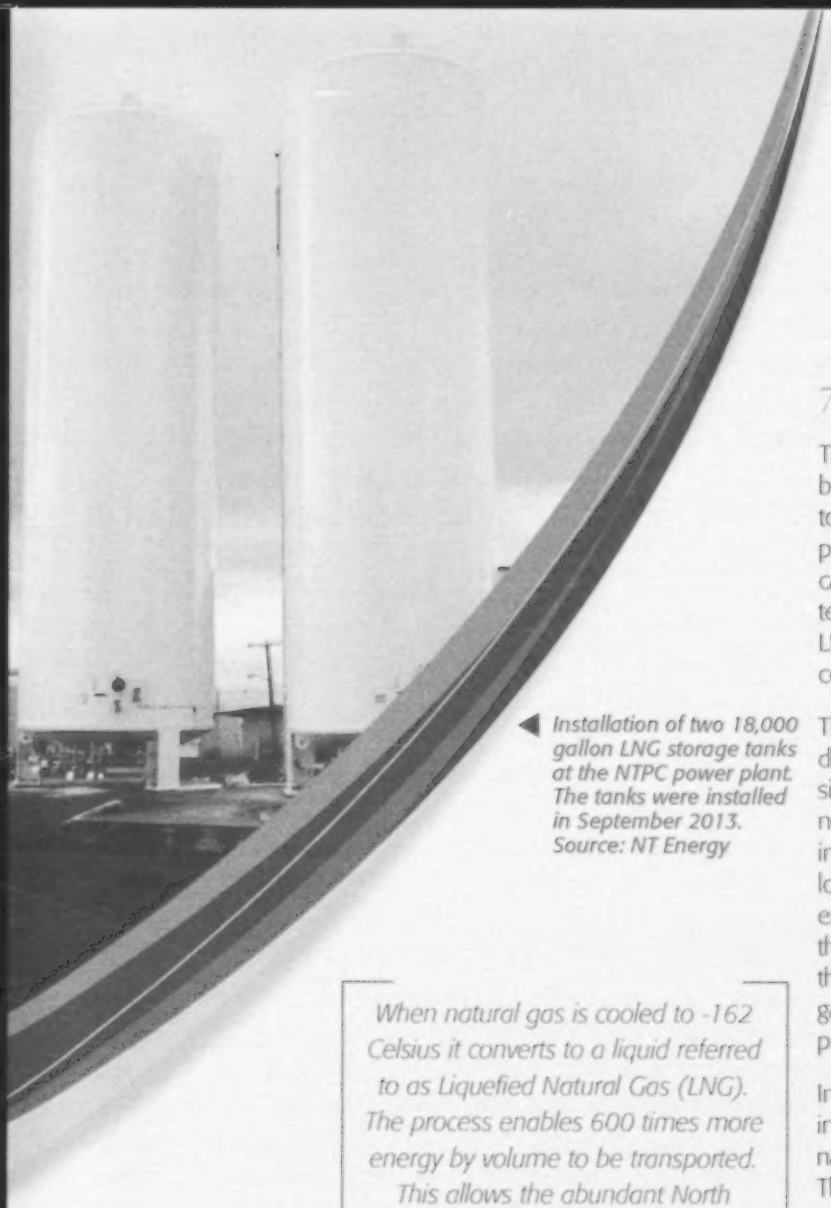
7.6.2. WIND MONITORING

The GNWT has been investing in wind monitoring since 2005 and has detailed data for various sites at many NWT communities. The Aurora Research Institute (ARI) is concluding three years of wind monitoring at Thor Lake and Wekweètì. The monitoring towers there will be dismantled and a final report will be produced for each location.

A second wind monitoring tower will be erected in the Inuvik area located about 6 kilometres North East of the community airport. ARI will be conducting a site assessment in Norman Wells to determine if a wind monitoring station in the area is suitable for a tower placement.

ACTION

Invest $50,000 per year over three years to continue to monitor wind speeds at various sites near communities in the NWT.



Installation of two 18,000 gallon LNG storage tanks at the NTPC power plant. The tanks were installed in September 2013. Source: NT Energy

When natural gas is cooled to -162 Celsius it converts to a liquid referred to as Liquefied Natural Gas (LNG). The process enables 600 times more energy by volume to be transported. This allows the abundant North American supply of natural gas to be transported to remote locations cost effectively.

7.7. LIQUEFIED NATURAL GAS

The NWT has an abundance of natural gas reserves, but for the most part lacks the economies of scale to exploit these resources for local heating and power generation. LNG, imported from the south, can help us to meet the objectives of reliability, long-term affordability and environmental protection. LNG has the potential to help the GNWT lower costs in thermal zone communities.

The price of natural gas in North America has declined while production has increased. This situation is making the use of LNG a possibility for northern communities. LNG could be imported into the NWT to replace dwindling supplies of local gas and provide an energy source that is less expensive and has 25% lower GHG emissions than the diesel alternative. This fuel source allows the NWT to be connected to the North American gas market without the construction of a costly pipeline.

In addition, bi-fuel conversion kits can be installed in existing diesel plants to fuel switch between natural gas and diesel, when LNG is available. These projects provide a simple payback within five years. The first step is to develop an LNG supply chain. Thermal communities with all-season road access will be the focus of the first phase of LNG systems development, as these communities will not require costly storage facilities.

ACTIONS	2013-14 Budget	2014-15 Targets	2015-16 Targets
ENERGY SUPPLY			
NATURAL GAS			
Introduce LNG Supply Chain in the Beaufort Delta	$100,000	-	-
LNG Conversion in the Thermal Zone	-	$150,000	$150,000
Sub-total	**$100,000**	**$150,000**	**$150,000**

7.7.1. INTRODUCE AN LNG SUPPLY CHAIN INTO THE BEAUFORT DELTA

NTPC has already investigated the possibility of using LNG in Inuvik and will commission a pilot project there in the autumn of 2013. By mid-2014, it is hoped that nearly 75% of the power needs of Inuvik will be met with LNG. The GNWT will further explore the potential costs, supply chain details, and benefits of using LNG in other communities, most notably Fort Simpson, Fort Liard and Fort McPherson, in order to foster a strong LNG supply chain in the NWT.

ACTION

Invest $100,000 in 2013-14 to develop a supply chain of LNG in Inuvik.

7.7.2. LNG CONVERSION IN THE THERMAL ZONE

A feasibility study is under way to examine the design and costs for a bi-fuel conversion of two of the existing diesel generators in Fort Simpson to burn LNG when it is available. It is estimated that nearly 60% of the power needs of Fort Simpson will be met with LNG. The current target date for commissioning of a bi-fuel system is autumn 2014. Once the supply chain is anchored at this site, the GNWT can begin to investigate other sites in the Dehcho region and beyond.

After an LNG supply chain is established in Inuvik and the product has been successfully sourced, transported, stored and used there, it will make sense to consider other communities along the Dempster Highway for LNG conversion. For instance, Fort McPherson could benefit from a bi-fuel conversion system and a small-scale, modular LNG system for electricity generation.

The GNWT will continue to invest in feasibility work but as the economics are so attractive, the conversion of some diesel generators can be accommodated with an investment by NTPC and the electricity rate base.

ACTION

Invest $150,000 in 2014-15 and 2015-16 to help expand the use of LNG in the NWT's thermal power plants.

7.8. INNOVATION

Generally, governments are in a unique position to help spur innovation and develop new markets and uses for energy technologies and services.

The GNWT has undertaken cutting-edge work in recent years, such as the installation of a hydrokinetic turbine in the Mackenzie River, the development of pilot project community wood marshalling yards to spur local biomass production, and investment in solar energy projects such as the 104 kW, Fort Simpson grid-tied installation. Typically this research and development work involves adapting a technology successfully deployed elsewhere for northern use.

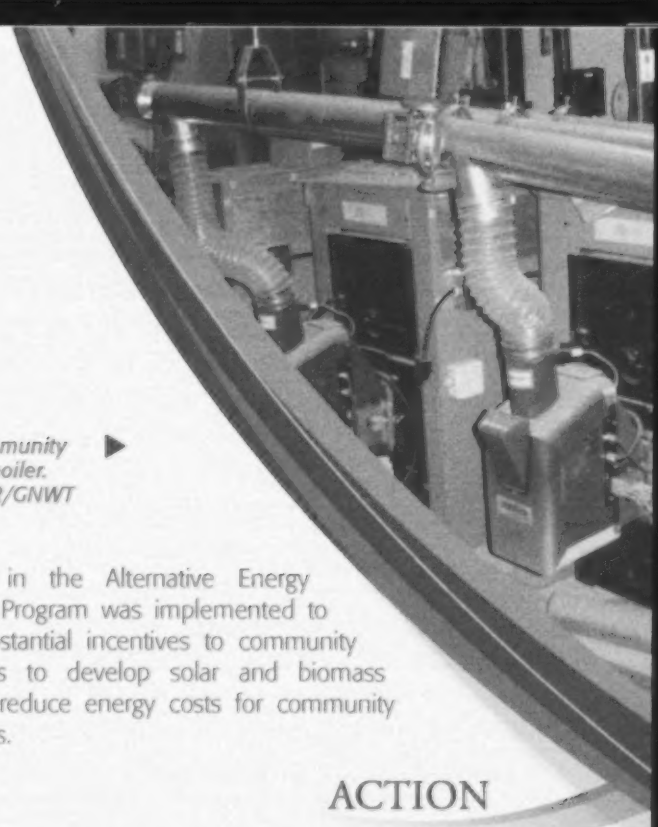
ACTIONS	2013-14 Budget	2014-15 Targets	2015-16 Targets
ENERGY SUPPLY			
INNOVATION			
Geothermal Feasibility	-	-	-
Alternative Energy Technology Program	$300,000	$300,000	$300,000
Electric Vehicle Demonstration Project	-	$15,000	$15,000
Sub-total	**$300,000**	**$315,000**	**$315,000**

7.8.1. GEOTHERMAL FEASIBILITY

A project in Fort Liard to develop geothermal energy for heating and electricity holds promise but has had difficulty attracting sufficient capital. It is also challenging to provide a firm risk assessment for the estimated $6- to $8-million investment required to verify the resource. This would involve drilling in the local area to quantify the depth and quality of the available geothermal heat.

ACTION

Using existing resources, the GNWT will continue to investigate the geothermal potential of the Dehcho region.



Dettah Community Hall pellet boiler. Source: ENR/GNWT

7.8.2. THE ALTERNATIVE ENERGY TECHNOLOGY PROGRAM

The Alternative Energy Technology Program provides up to $5,000 to residents who install eligible renewable energy technologies, such as solar, wind, wood pellet heating, biofuels, synthetic gas and ground source heat pumps.

This program provides funding to residents, businesses and communities interested in installing renewable energy technologies such as solar, wind, wood pellet heating, biofuels, synthetic gas and ground source heat pumps.

A change in the Alternative Energy Technology Program was implemented to provide substantial incentives to community governments to develop solar and biomass projects to reduce energy costs for community governments.

ACTION

The GNWT will invest $300,000 annually in the Alternative Energy Technology Program to assist residents, businesses, communities, and organizations with the installation of various renewable energy systems.

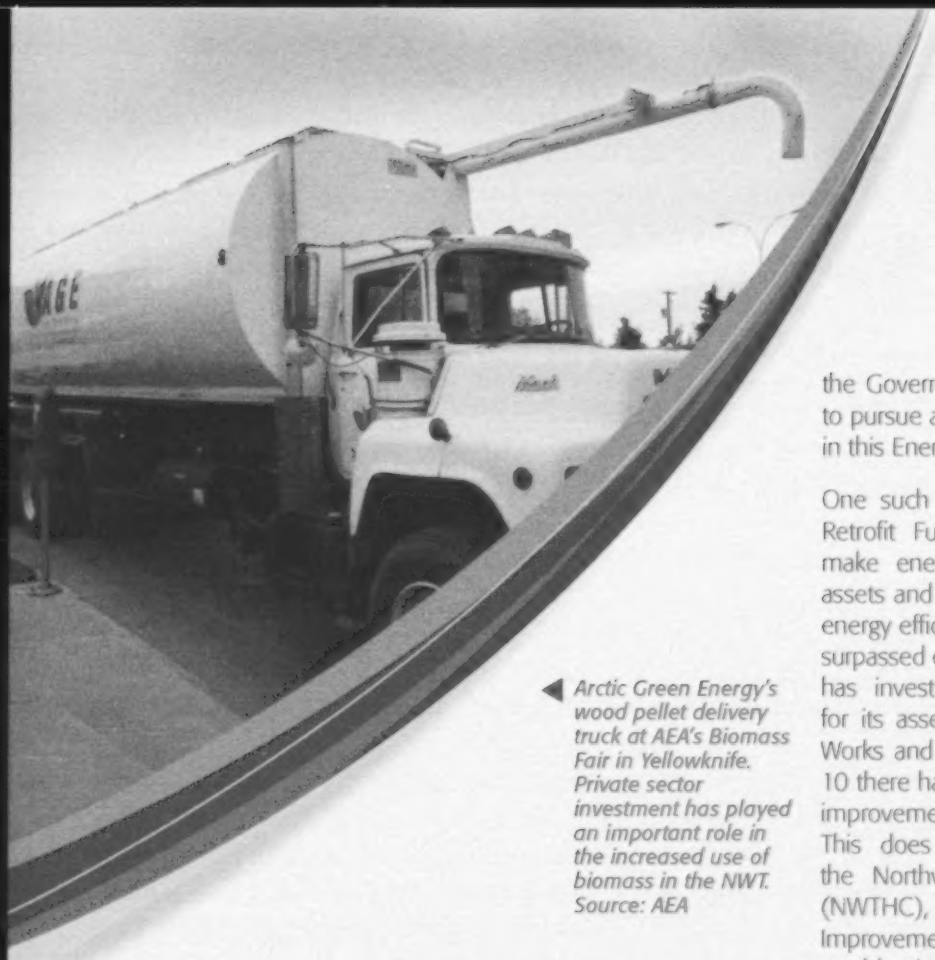
7.8.3. ELECTRIC VEHICLE DEMONSTRATION PROJECT

There are few options to reduce environmental emissions or operating costs from transportation activities. Currently, the transportation market in the NWT is exclusively fuel based, but the emergence of plug-in electric vehicles to the mass market represents an opportunity for hydro-based communities to utilize a lower cost, local energy alternative. Electric vehicles are evolving rapidly, with a number of options available today and additional choices expected in the future.

The small size of NWT communities means that the range of current electric vehicles is more than sufficient to meet the needs of the average commuter. The operating cost of electric vehicles is estimated to be about 60 to 70% that of fuel-based vehicles, so the technology yields an operating cost savings, although upfront prices remain a barrier. The electric car industry has put a focused effort on ensuring their vehicles are cold weather compatible, but questions remain on how effective they will perform in an NWT winter. Other jurisdictions are investing billions of dollars in the future of the plug-in vehicle market. The GNWT is interested in the long-term potential of the technology and its relationship to locally sourced hydro power. An important step in the adoption of the technology is to introduce it to people first hand. An electric vehicle will be leased, driven and tested by the AEA. In addition, some market research will be conducted to understand the public perception of this technology, which will help determine the basis for future Government investment in this area.

ACTION

Invest $15,000 in 2014-15 and 2015-16 to lease an electric plug-in hybrid vehicle that will be tested by the Arctic Energy Alliance.



Arctic Green Energy's wood pellet delivery truck at AEA's Biomass Fair in Yellowknife. Private sector investment has played an important role in the increased use of biomass in the NWT. Source: AEA

Investments in energy initiatives since 2007 are yielding the GNWT $1,400,000 in annual savings (2012-13).

7.9. GNWT LEADERSHIP

The GNWT is able to assume risks, straddle market forces, and experiment in areas where businesses and residents cannot. The GNWT can also re-orient its regulatory and policy apparatus to lend institutional support to new initiatives. This enables the Government, through its policymaking ability, to pursue all of the overarching objectives laid out in this Energy Plan.

One such initiative has been the Capital Asset Retrofit Fund. This program was designed to make energy efficiency investments in GNWT assets and invest the savings realized into further energy efficiency improvements. This program has surpassed expectations and since 2007 the GNWT has invested substantially in energy efficiency for its assets through the Department of Public Works and Services (PWS). As well, since 2009-10 there has been $4 million for energy efficiency improvements in public housing infrastructure. This does not include investments made by the Northwest Territories Housing Corporation (NWTHC), which through its Modernization and Improvement Program, targets energy upgrades to older, inefficient public housing units slated for major repairs.

The investments made in energy efficiency and biomass systems do not only save the GNWT money, but also support local economies and help to establish local capacity. In the case of biomass, these investments can provide the foundation for spurring an entirely new industry as discussed in Section 7.4.

Proposed investments in GNWT assets are discussed below.

ACTIONS	2013-14 Budget	2014-15 Targets	2015-16 Targets
GNWT LEADERSHIP			
Capital Asset Retrofit Fund (CARF)	$1,200,000	$3,500,000	$3,000,000
Energy Efficiency Upgrades for Public Housing	$700,000	$700,000	$700,000
Biomass Heating Systems	$1,650,000	$1,400,000	$750,000
Sub-total	**$3,550,000**	**$5,600,000**	**$4,450,000**

7.9.1. CAPITAL ASSET RETROFIT FUND

The GNWT will fund energy upgrades in GNWT facilities through investments of $1.2 million, $3.5 million, and $3.0 million over three fiscal years (2013-2016).

The Capital Asset Retrofit Fund (CARF) was established to upgrade existing GNWT buildings that are not energy efficient. The program assists the government in reducing building operating costs and GHG emissions. Without retrofits, these assets would continue to deteriorate, increasing operation and maintenance costs and shortening their overall service life.

In the past, CARF projects have involved upgrades such as efficient lighting retrofits, heating, ventilation and air conditioning control upgrades, increased insulation in walls, door and door seal replacements, window replacements, and efficient plumbing fixtures. Over 26 facilities in 17 different communities across the NWT have had energy retrofits.

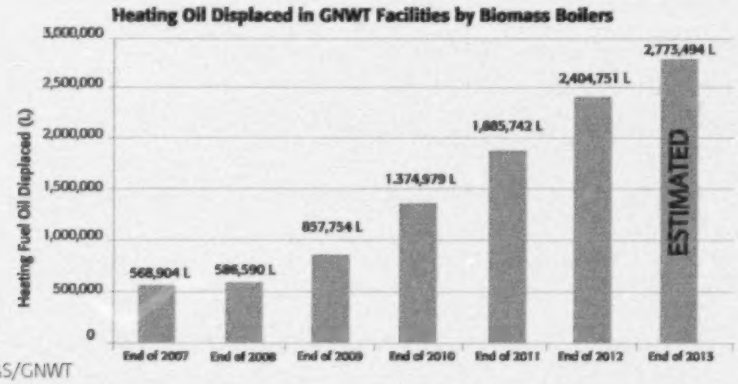
In the 2013/2014 fiscal year, the GNWT is planning to upgrade the following buildings and systems: lighting systems in a number of facilities in the North Slave region; the ventilation system in Chief Jimmy Bruneau School in **Behchokǫ̀**; two schools and an office building in Fort Simpson, and the exteriors of several buildings in Hay River, Tsiigehtchic and Sachs Harbour. These projects will help reduce GHG emissions by 148 tonnes and help save approximately $116,000 in utility costs annually.

7.9.2. BIOMASS HEATING SYSTEMS

The GNWT is recognized as a national leader in the installation of commercial wood pellet boilers. By 2013, the GNWT had commissioned 15 biomass heating systems, with three more in design or under construction. The 15 installations can displace more than 2.8 million litres of heating oil per year and reduce GHG emissions by up to 6,500 tonnes annually. This represents a $1 million reduction in annual heating costs.

The GNWT will support the expansion of the pellet supply network in the NWT by installing three wood pellet boilers in Norman Wells, targeting the Mackenzie Mountain School, the Airport Terminal Building, and the Combined Services Building at the airport. In total, these projects will help reduce GHG emissions by 352 tonnes per year.

The GNWT has assessed its building portfolio to identify potential biomass conversion projects. This process has identified the Yellowknife Airport Terminal Building and Prince of Wales Northern Heritage Centre as candidates for conversion in 2014-15. The airport project will cost $750,000 and will displace 320,000 litres of propane annually, generating an annual savings of $80,000. GHG emissions will be reduced by 477 tonnes annually. The museum conversion will cost $650,000 and will displace 185,000 litres of heat oil annually. This will reduce heating costs by $50,000, as well as, over 290 tonnes of GHG emissions annually.



Source: PW&S/GNWT

Additionally, a Government facility located in a community without an established bulk pellet supply will be targeted in 2015-16; this project is a way to further expand the pellet supply network.

The GWNT will continue to look at the feasibility of installing additional wood pellet boilers in its facilities.

ACTION

Invest $3.80 million over the next three years (2013-2016) to install biomass boilers in GNWT facilities.

7.9.3. ENERGY EFFICIENCY UPGRADES FOR PUBLIC HOUSING

Under the delivery of the Public Housing Program, the GNWT spends millions of dollars each year on energy, including $7.8 million for heating fuel in 2013-2014.

The NWTHC operates 2,350 public housing units, of which approximately 10% have had energy efficient retrofits conducted under previous years' Strategic Energy Initiatives in order to reduce annual operating costs and GHG emissions.

In order to ensure continued improvement in energy outcomes, the NWTHC is confirming the feasibility of installing high-efficiency wood pellet boilers in six multi-unit public housing complexes (over 50 units) in six communities. This initiative will reduce GHG emissions and associated fuel costs. This investment will provide the NWTHC with the opportunity to monitor the performance of the systems including decreases in costs and GHG emissions. The NWTHC will also identify further public housing assets that may realize energy costs savings through the use of wood pellet boilers.

ACTION

Dedicate $700,000 in each of the following three years to the installation of wood pellet boilers and perform other energy upgrades in multi-unit housing complexes operated by the NWT Housing Corporation.

7.10. POLICY AND PLANNING

Increasing the amount of local and renewable energy we use, improving affordability, and ensuring reliability are all objectives that need to be supported by appropriate policies. Creating the right policy environment can ensure that new sources of energy are developed and may succeed, that communities and residents are encouraged to achieve desired objectives, and that we can properly measure results and engage communities in managing our energy use and impacts on the environment.

The 2012 NWT Energy Charrette identified a number of policy issues to be addressed through this Energy Plan, and some past policy issues related to the Electricity Review of 2010 remain to be discussed and implemented.

One item raised at the Charrette and not included in the policy commitments listed in this section is energy efficiency standards for new buildings throughout the NWT. The City of Yellowknife already has a by-law and where possible, the process for new buildings should be managed at the community level. Providing building inspections to enforce energy standards in remote communities would be a significant challenge and much of the permitted work in buildings in remote communities is not currently inspected.

ACTIONS	2013-14 Budget	2014-15 Targets	2015-16 Targets
POLICY AND PLANNING			
Issue Strategic Direction to NTPC	Includes an Accountability Framework – a commitment from the 2010 Electricity Review		
Reaffirm role of the PUB	Clarify the role of the GNWT with respect to issuing policy direction to the Board in 2014		
Develop Performance Indicators & expand energy data collection capacity	Funded with existing resources		
Establish a Net Metering Renewable Energy Policy	Policy in development, finalize in 2014		
Adjust Stand-by Rate Policy to Support Renewables	Policy in development, finalize in 2014		
Energy Efficiency Standards	Research costs and benefits, report published by October 2014		
Collaborative Policy Development	Commit to future collaborative policy development		
Promote Energy Literacy	Fund through existing resources to the AEA		
Research Innovative Financing Mechanisms	Evaluate cost/benefit of changes to the *Cities, Towns and Villages Act* to allow for municipalities to implement Local Improvement Charges for energy retrofits.		
NT Energy Core Funding	$700,000	$700,000	$700,000
Sub-total	**$700,000**	**$700,000**	**$700,000**

Below is a detailed review of the following policy commitments the GNWT will take action on over the next three years.

7.10.1. ISSUE STRATEGIC DIRECTION TO NTPC AND IMPLEMENT AN ACCOUNTABILITY FRAMEWORK

NTPC is a crown corporation, but for many years the GNWT has not taken full advantage of its ability to promote change in the NWT electricity sector through the corporation. By issuing strategic direction to NTPC, the GNWT will take full advantage of the opportunity to use this crown corporation to further the public interest in energy. The 2010 Electricity Review also recommended the implementation of an accountability framework.

ACTION

Issue strategic direction to NTPC and implement an accountability framework to demonstrate the corporation's alignment with priorities established by the Legislative Assembly.

7.10.2. REAFFIRM THE ROLE OF THE PUBLIC UTILITIES BOARD

As the energy challenges, opportunities, and issues within the NWT change, so do the roles and priorities of the Public Utilities Board (PUB). Actions such as a net metering program, the installation of more renewable energy systems, and rising fuel costs all create new management challenges. The GNWT will continue to work with the PUB to reaffirm its role.

In 2010, the GNWT issued policy direction to the PUB in order to establish electricity rate zones and implement other aspects of the GNWT Electricity Review. Extending electricity services to resource development sites or the development of an interconnection to the continental electricity grid (as envisioned in the Power System Plan) could lead to additional instances where public policy direction is required. The GNWT will develop policy to clarify when policy direction should and should not be issued. The key is to balance the independence of the PUB with the need to ensure alignment with public policy objectives.

ACTION

Reaffirm the role of the PUB and clarify the role of the GNWT with respect to issuing policy direction to the Board.

7.10.3. DEVELOP ENERGY PERFORMANCE INDICATORS AND MEASUREMENT CRITERIA

Energy performance indicators and measurement criteria are needed to track progress and guide decision making. However, they have not been formally established for energy planning purposes. This inhibits the GNWT's capacity to measure progress and develop policies and actions that will effectively achieve objectives. Contributing to this issue is a lack of quality data on energy consumption for communities. Various departments and agencies track certain data and report on specific issues, but the GNWT lacks a central reporting and information-sharing mechanism needed to effectively develop performance indicators.

In an effort to develop performance indicators and measurement criteria to improve decision making, the GNWT has an agreement with the University of Calgary's Institute for Sustainable Energy, Environment and Economy (ISEEE). ISEEE will work with the GNWT to facilitate the development of performance indicators and measurement criteria. The process will include a PhD student from ISEEE working on applied research in Yellowknife and a series of workshops led by Dr. Joe Arvai, the Svare Chair in Applied Decision Research in ISEEE. The outcome of this process will include defining performance indicators and evaluation criteria, as well as ensuring that systems are in place to track and populate them with the necessary data.

ACTION

The GNWT will work with the University of Calgary to develop performance indicators and measurement criteria, as well as ensure systems are in place to track and populate them with the necessary data.

7.10.4. ESTABLISH A NET METERING RENEWABLE ENERGY POLICY

In response to strong stakeholder interest, NTPC in partnership with the GNWT, is developing a net metering policy and program that will support private, small-scale investment in renewable electricity generation. Net metering is designed to support those customers interested in generating their own power to use the grid as storage for any excess electricity generation they produce above their immediate needs. This excess electricity credit can then be used at a later time when the customer's self-generation cannot meet their needs. At times when neither the current self-generation nor the "banked" excess generation can meet a customer's needs, the customer purchases electricity from the grid as they do now.

Nahanni Butte Grid-tie solar PV systems. Source: GNWT/ENR

A system-wide approach is required to ensure equity for all ratepayers and to ensure that the overall objectives of this Energy Plan are achieved. The aim of the program is to help participants reduce their power bills, without increasing costs to ratepayers.

ACTION

Develop a net metering renewable energy policy in 2014 to encourage and clarify the process of installing grid-connected renewable energy systems.

7.10.5. ADJUST STAND-BY RATE POLICY

When the utility's customers generate their own power, the utility must maintain the generation capacity to service those customers when they require power. This creates idle capital that is not generating revenue for the utility. To address this issue utilities charge a stand-by rate on the customers, installed capacity – in the NWT, the charge is $24 per installed kW per month for installations over 5 kW. This rate is substantially higher than anywhere else in the country. The original intent of the stand-by charge was to address customers who were generating most of their own load requirement with fossil fuel. A stand-by rate policy for renewable installations will be developed.

ACTION

A Stand-by Rate policy for renewables will be developed in 2014.

7.10.6. INVESTIGATE THE ESTABLISHMENT OF AN NWT ENERGY EFFICIENCY ACT

At least five provinces, including Nova Scotia, New Brunswick, Ontario, British Columbia, and Manitoba, have energy efficiency acts that regulate the sale of appliances and other products. For example, the energy acts of New Brunswick and Nova Scotia prohibit the sale of appliances that do not meet minimum energy efficiency standards and also establish labeling standards. Businesses contravening the acts can receive fines.

Some items covered by the acts of these two provinces include fuel burning appliances, kitchen electric ranges, washing machines, clothes dryers, dishwashers, electric storage type water heaters, refrigerators, air conditioning equipment, electric motors, vending machines, lights, and lighting ballasts. The acts use existing efficiency standards such as those developed by the Canadian Standards Association (CSA) and the American National Standards Institute (ANSI).

Currently, the GNWT provides financial incentives for purchasing efficient appliances and other equipment or products. Some funding from this program could be redirected towards the implementation and enforcement of an energy efficiency act which would provide more widespread and significant energy efficiency improvements across the NWT. Products currently included in the energy efficiency incentive program and could be regulated with an energy efficiency act are windows, doors, skylights, furnaces and boilers, refrigerators, and washing machines. Additional products such as electrical ranges, vending machines, printers, photocopiers, and other electronics could be included.

The GNWT will investigate the challenges and opportunities of implementing an energy efficiency act, the resources required, and will determine which appliances and products could be included to provide beneficial energy and life cycle cost savings. A report will be published by in 2014.

ACTION

Investigate the challenges and opportunities of implementing an *energy efficiency act* in the NWT.

7.10.7. COMMITMENT TO COLLABORATIVE POLICY DEVELOPMENT

In November 2012, over 125 stakeholders from across the NWT and Canada came together to discuss some of the most pressing energy issues facing our Territory's residents and businesses, during the 2012 Northwest Territories Energy Charrette. The outcomes of the Charrette planning process informed the development of this Energy Plan. The Energy Charrette Final Report requested that the GNWT continue involving stakeholders in policy dialogue.

As such, when new energy policies are being developed, the GNWT commits to ensuring that affected stakeholders are involved in the development process. This will involve Aboriginal governments, communities, industry, NGOs and government personnel from all levels, and will help chart the course forward for future Legislative Assemblies.

ACTION

The GNWT commits to using a collaborative process when developing future energy policy.

7.10.8. PROMOTE ENERGY LITERACY

Governments across Canada have taken up energy literacy as a topic of prime importance in public education. The public needs to better understand the way it uses energy in order to reduce consumption and better plan for the future. In particular, educating youth about energy issues is a valuable investment in their future, and will spark an interest in young people to be future energy leaders and innovators. A better understanding of energy issues in communities will help individuals reduce their cost of living through sustainable energy use. It will help them reduce the environmental impact of their energy use and lead to improved energy security across the NWT.

ACTION

The GNWT will direct the Arctic Energy Alliance to expand its energy literacy and outreach programs. The GNWT will also promote energy literacy through written and online media, in order to improve awareness of programs that can help them make better energy decisions.

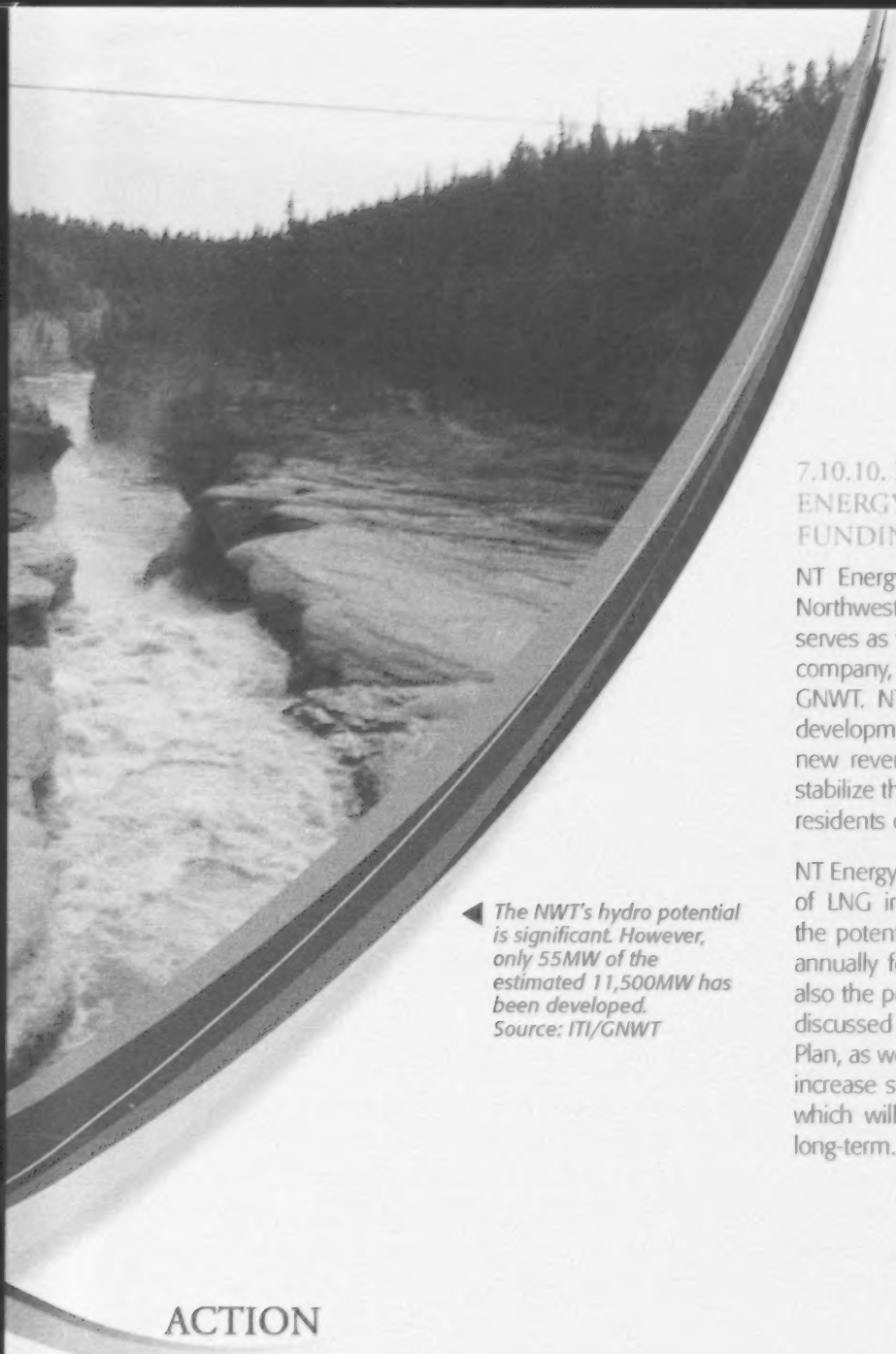
7.10.9. RESEARCH INNOVATIVE FINANCING MECHANISMS

Research indicates that individuals often need upfront financing to conduct energy improvements on their homes. However, many homeowners do not have access to these funds and have competing priorities with their money. Additionally, many homeowners resist making energy retrofits if they plan to move before they can recoup their costs through energy savings. A number of jurisdictions have amended their 'Local Improvement Charge' legislation to allow for the development of energy financing programs designed to address the above constraints. The current NWT legislation restricts municipal financing to individual landowners.

The NWT Association of Communities passed a resolution requesting that the GNWT make amendments to legislation to allow communities to offer innovative financing programs designed to address the above issues. An innovative financing program will enable municipalities to support residents in their effort to reduce energy expenditures and environmental impacts. In addition, these programs generate local economic activity and jobs in the building trades.

ACTION

The GNWT will consider changes to the *City, Towns and Villages Act* to enable communities to use Local Improvement Charge legislation for the purposes of offering energy financing programs to individual property owners.



The NWT's hydro potential is significant. However, only 55MW of the estimated 11,500MW has been developed. Source: ITI/GNWT

7.10.10. NORTHWEST TERRITORIES ENERGY CORPORATION – CORE FUNDING

NT Energy is the unregulated subsidiary of the Northwest Territories Hydro Corporation. NT Energy serves as the lead business developer for its sister company, the NTPC, and is wholly-owned by the GNWT. NT Energy works with NTPC, Aboriginal development organizations and industry to create new revenue streams for the crown sector and stabilize the price of energy for the businesses and residents of the NWT.

NT Energy has played a key role in the introduction of LNG into the NWT, a development that has the potential to save the NTPC millions of dollars annually for the foreseeable future. NT Energy is also the project leader for the Power System Plan, discussed earlier. A goal of the Power System Plan, as well as NT Energy as an organization, is to increase system stability and economies of scale, which will stabilize the cost of energy over the long-term.

ACTION

The GNWT will allocate $700,000 annually to provide core, operational funding for the Northwest Territories Energy Corporation.

8. CONCLUSION

This Energy Action Plan is intended to strike a balance between short-term actions to reduce the cost and environmental impact of our energy use, while building towards a sustainable energy solution over the long-term. Energy conservation and efficiency and the greater use of alternative sources of energy will reduce our reliance on imported oil in the short term. Enhancing energy infrastructure and connecting NWT communities could provide far more flexibility in providing power, allow for development of NWT hydroelectric potential and reduce our energy costs over the long-term. Achieving such a vision would also support the GNWT Economic Opportunities Strategy and Mineral Development Strategy.

This process began with a collaborative policy development exercise in the Energy Charrette held in November 2012. However, the process should not be considered complete. The GNWT remains committed to continuing the discussion, monitoring the results of this plan, and making continual improvements and adjustments based on the input of residents, industry and community and Aboriginal governments.

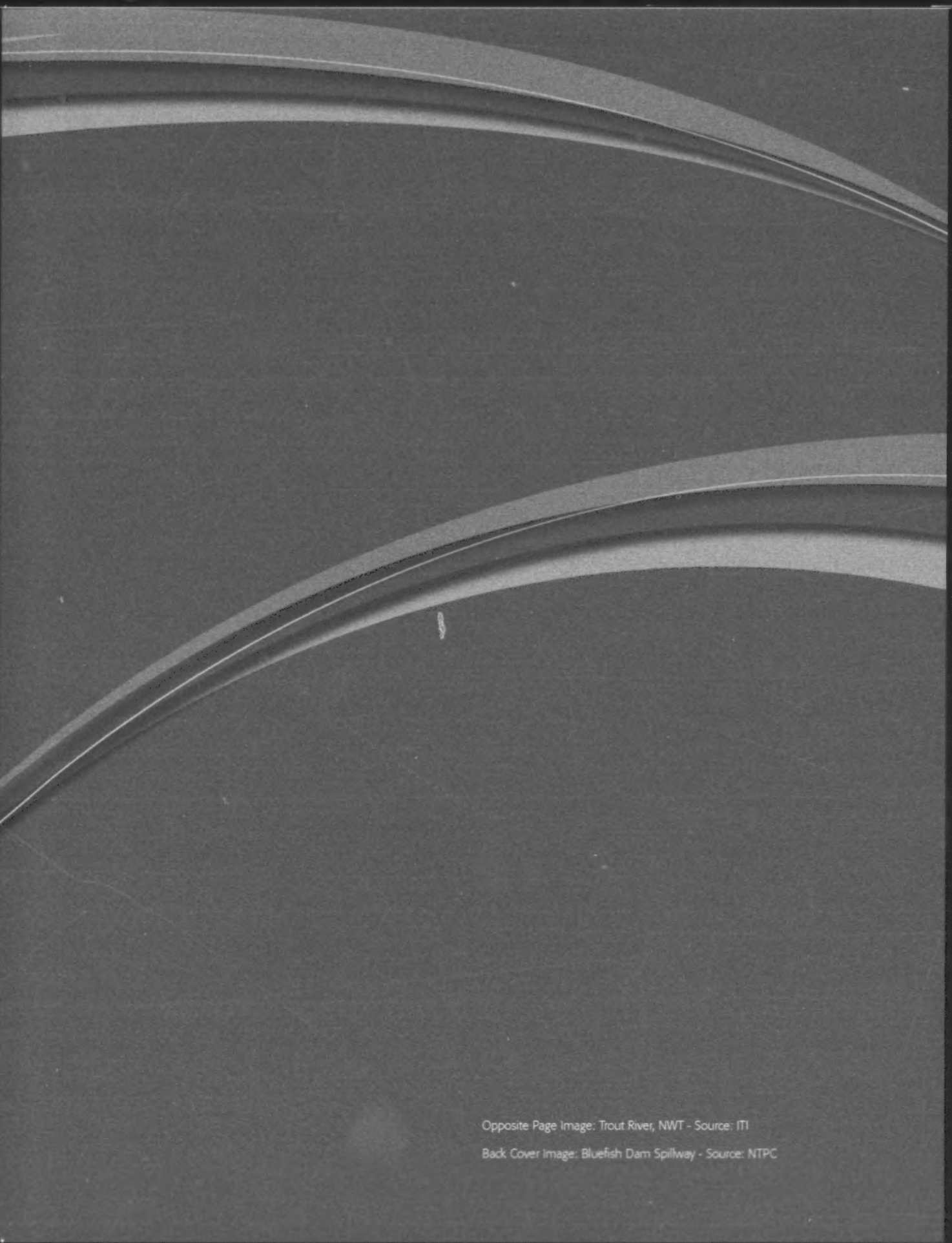
Installation of wind turbine at Diavik Mine
Source: Diavik Diamond Mine

9. APPENDICES

APPENDIX A: SUBSIDIES

GNWT Subsidization	2006-07	2012-13
Fuel Price Subsidization		
Public Works and Services manages the purchase, transport, and storage of bulk petroleum products for sixteen NWT communities and in twenty communities for the NTPC. The cost to the GNWT for financing and amortization is not passed on to end customers or the Power Corporation. These numbers fluctuate based on capital investment and other factors.	$976,000	$2,450,000
Seniors Home Heating Subsidy		
The Senior Home Heating Subsidy provides financial assistance to low income seniors to help them pay for the cost of heating their homes. In 2006/07 the program supported 373 households and has increased to 442 by 2012/13.	$1,058,000	$1,354,000
Public Housing – Energy Support		
The Housing Corporation pays the full cost of heating fuel for its 2,350 housing units costing $7.237 million in 2012-13. Electricity is subsidized to $0.09 per kWh, which is valued at $7.801 million.	$11,600,000	$15,038,000
Territorial Power Subsidy Program (TPSP)		
The GNWT subsidizes the power consumption in communities, where residential electricity rates (base rates and riders) exceed the Yellowknife reference rate, reducing the price of the first 1,000 kWh to $0.25 between September and March. For the remainder of the year the first 600 kWh is subsidized to the same rate. The transition to the rate zone reduced the cost of the TPSP to the GNWT as thermal zone rates were reduced.	$8,300,000	$5,214,800
GNWT Rate Equalization Program for NUL's Thermal Communities (GREP)		
GREP was introduced in December 2010. It is applied to both non-government residential and commercial customers in Northland Utilities (NUL) thermal rate zones of Fort Providence, Wekweètì, Trout Lake and Dory Point/Kakisa. The GREP ensures that NUL thermal non-government customers are paying the same effective energy rates as NTPC's thermal zone non-government customers.		$518,000
Government Facilities Power Rate Premium		
The GNWT buildings are charged a higher power price than the average required rate in communities outside of Fort Smith and Yellowknife. The additional revenue generated from government is used to reduce the retail rate to customers.		$5,260,000
Total Subsidized	**21,934,000**	**29,834,800**

Transition Support for the 2012-13 General Rate Application		
In the process leading up to the 2012-13 General Rate Application (GRA), NTPC identified required rate increases of nearly 15% per year for two years. The GNWT decided to spread those cost increases over a four year period to reduce 'rate shock' to communities and residents. The GNWT committed $34 million and spread the rate impact over four years, resulting in rate increases of approximately 7% for 2012-13, 2013-14 and 2014-15 and 5% for 2015-16.		
2012-13	Cash contribution of $11.630 million plus $2.0 million in forgone dividend	$13,630,000
2012-13	Rate Rider fuel stabilization fund	$4,000,000
2013-14	Cash contribution of $9.484 million plus $2.0 million in forgone dividend	$11,484,000
2014-15	Cash contribution of $2.892 million plus $2.0 million in forgone dividend	$4,892,000
Total		**$34,006,000**



Opposite Page Image: Trout River, NWT - Source: ITI

Back Cover Image: Bluefish Dam Spillway - Source: NTPC

NORTHWEST TERRITORIES
ENERGY ACTION PLAN

A THREE-YEAR ACTION PLAN AND A LONG-TERM VISION

WWW.ITI.GOV.NT.CA/ENERGY